



Faculty of Medicine
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**MENTAL HEALTH STATUS OF PEOPLE WITH
SPINAL CORD INJURY AFTER THE COMPLETION
OF FITNESS SESSION**

By

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

“MENTAL HEALTH STATUS OF PEOPLE WITH SPINAL CORD INJURY AFTER THE COMPLETION OF FITNESS SESSION”

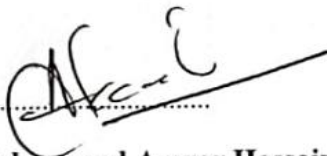
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DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also decline that same any publication, presentation or dissemination of information of the study. I would bind to take consent from the department of Physiotherapy of Bangladesh Health Profession Institute (BHPI).

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CONTENTS

Topic	Page no.
Acknowledgement	i
Acronyms	ii
List of tables	iii
List of figures	iv
Abstract	v
CHAPTER- I: INTRODUCTION	1-9
1.1 Background	1-5
1.2 Rationale	6
1.3 Objectives	7
1.4 Conceptual Framework	8
1.5 Operational Definition	9
CHAPTER II: LITERATURE REVIEW	10-17
CHAPTER- III: METHODOLOGY	18-24
3.1 Study design	18
3.2 Study site	18
3.3 Study population	18
3.4 Sampling technique	18
3.5 Sample size	19
3.6 Data collection tools	20
3.7 Data collection procedure	20
3.8 Data analysis	20-21
3.9 Inclusion criteria	21
3.10 Exclusion criteria	21
3.11 Ethical consideration	22
3.12 Informed consent	23
3.13 Rigor of the study	24

CHAPTER- IV: RESULTS	25-43
CHAPTER –V: DISCUSSION	44-47
5.1 Limitation	47
CHAPTER-VI: CONCLUSION AND RECOMMENDATION	48-49
6.1 Conclusion	48-49
6.2 Recommendation	49
REFERENCES	50-57
APPENDIX	58-72
Inform consent (Bangla)	58
Inform consent (English)	59
Questionnaire (Bangla)	60-64
Questionnaire (English)	65-70
Permission Letter	71
IRB Permission Letter	72

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ACRONYMS

ADL	Activity of Daily Living
BHPI	Bangladesh Health Profession's Institute
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed
IRB	Institutional Review Board
PHQ-9	Patient Health Questionnaire-9
SCI	Spinal Cord Injury
USA	United State of America

LIST OF TABLES

Table No	Description	Page No
Table 1	Socio-demographic information	37
Table 2	Interpretation of PHQ-9	38
Table 3	Association in between PHQ-9 & Socio-demographic information	39
Table 4	Interpretation of GAD-7	41
Table 5	Association in between GAD-7 & Socio-demographic information	42

LIST OF FIGURES

Figure No	Description	Page No
Figure 1	Gender	25
Figure 2	Age group	26
Figure 3	Types of paralysis	27
Figure 4	Marital status	28
Figure 5	Education level	29
Figure 6	Occupation	30
Figure 7	Residential area	31
Figure 8	Causes of injury	32
Figure 9	Severity of injury	33
Figure 10	Skeletal level	34
Figure 11	Neurological level	35
Figure 12	Monthly income	36
Figure 13	Interpretation of PHQ-9	38
Figure 14	Interpretation of GAD-7	41

ABSTRACT

Background: Spinal cord injury is a injury to the spinal cord that can be caused by traumatic or non-traumatic resulting a wide range of impairments, activity limitations and participations restrictions. **Objectives:** To find out mental health effects of people with spinal cord injury after the completion of fitness sessions. **Methodology:** The study design was cross-sectional. A total of 50 samples were selected conveniently for this study from the Centre for the rehabilitation of the paralyzed (CRP), Spinal cord injury unit, at Savar. Data was collected by using of structured questionnaire and mental health was assessed by Patient Health Questionnaire (PHQ-9) and Generalised Anxiety Disorder (GAD-7). The study was conducted by using quantitative descriptive analysis through SPSS software 20.0 version. **Results:** Among the respondents, most of them were male where 60% were married & 40% unmarried. Paraplegic patients were greater than tetraplegic patients, 40% had incomplete-B in American Spinal Injury Association scale. Most of them have mild depression and moderate anxiety level, which indicates their mental health status level. **Conclusions:** A significant portion of SCI patients were found to be mildly depressed because of including in a fitness sessions. And the level of depression is much less among paraplegic patients. But the level of anxiety is moderate among most of the patients after completing a fitness sessions.

Keywords: Mental health, Spinal cord injury, Fitness session.

1.1 Background

Spinal cord injury is a injury to the spinal cord that can be caused by traumatic or non traumatic resulting a wide range of impairments, activity limitations and participations restrictions (New et al. 2012). It can cause temporarily or permanently changes in its function (Ahuja et al. 2017). Depending on the level and severity of the injury, spinal cord injury can impair motor, sensory and autonomic function (Noonan et al. 2013). Spinal cord injury brings not only impair in physical function but also in mental function commonly depression and anxiety (Nas et al. 2015).

Spinal cord lies within spinal canal, not entire vertebral canal. The length of the spinal cord is about 45 cm in men and 43 cm in women its width is ranges from 1.27 cm in cervical and lumbar regions to 64 mm in the thoracic region. The spinal cord is divided into 31 segments: eight cervical, twelve thoracic or dorsal, five lumbar, five sacral, and one coccygeal (Bican, Minagar and Pruitt, 2013). Injury to any part of the spinal segments that can be happened as a consequence of compulsion, incision, or contusion from the foramen magnum to the cauda equina (Nas et al. 2015).

Spinal cord injury (SCI) is a fatal disorder that can happen suddenly (as in car accidents, slips and falls, sports injuries, or industrial mishaps) or over time (as in spinal tumors or transverse myelitis). The global incidence of SCI ranges from 16 to 40 people per million (Guilcher et al. 2015). The US has the greatest prevalence of SCI worldwide at 906 per million (Lim at al. 2017). Although there is significant regional variance, with North America having a rate of 40 cases per million to Australia having a rate of 15 cases per million, the estimated global incident rate of SCI is 23 cases per million. Males between the ages of 18 and 32 and older adults in wealthy nations with aging populations have the highest incidence of SCI globally. More than 2 million people live with a SCI globally (Tweedy et al. 2017). Global estimates of the annual incidence of traumatic spinal cord injury range from 10 to 85 per million people, depending on the location under consideration (Fehlings et al. 2023).

The claimed global prevalence ranges from 236 to 4187 per million, however these figures are severely restricted by the absence of published data from Africa and South America and the unavailability of data from Asian nations (Witiw and Fehlings, 2015). A subnational research in Canada found an incidence of TSCI of 3.6 per million, while a subnational study in Ireland found an incidence of 195.4 per million. The incidence of TSCI varies from 5.1 per million in Pakistan to 71 per million in Brazil, based on data that can only be analyzed through national surveys or national registries (Miyakoshi et al. 2021).

In Bangladesh, there are 2.5% cases per million individuals with spinal cord injuries, according to reports (Hoque et al. 2012). SCI is still one of the leading causes of disability not just in Bangladesh but also throughout Asia (Islam et al. 2011). According to a study conducted at CRP in Bangladesh, the most affected population were male the percentage was 81.8 and mean age was 34.5 years. The most susceptible age group was 16-30 years accounting for 45.7%. Among 600 SCI populations, 83.5% had traumatic injuries and 16.5% had non-traumatic injuries. 80.0% patients were paraplegic and just 20% were tetraplegic (Razzak et al. 2016). Another study showed that 60% had paraplegia and 40% had tetraplegia among the participant (Hossain, 2016).

Spinal cord injury can occur as a result of either traumatic or non-traumatic causes (New et al. 2012). The most common traumatic causes of spinal cord injuries are car accidents, falls from great heights, sports-related injuries, and violent incidents. The non-traumatic causes of spinal cord injury are acute or chronic disease processes, such as a tumor, infection, or degenerative disc disease. In certain wealthy countries, non-traumatic SCI is more prevalent than traumatic SCI. Men are more often than women (20.2%) to suffer from traumatic SCI (79.8%) (Ahuja et al. 2017).

Based on motor and sensory functions, spinal cord injuries are categorized by the American Spinal Injury Association (ASIA). ASIA states that SCI can be divided into two categories: complete and incomplete injury. Only ASIA-A also called complete injury means there is no sensory or motor function preserved in the sacral segments of S4-S5. ASIA-B also called sensory incomplete means motor deficit without sensory loss below the neurological level, including the sacral segments of S4-S5 and there is no

protected motor function from three levels below the motor level at each half of the body. Both ASIA-C and ASIA-D are motor incomplete. ASIA-C means Motor function is preserved below the neurological level and more than half of the muscles below this level have strength lower than 3/5 and ASIA-D means Motor function is preserved below the neurological level and at least half of the muscles (half or more) below this level have strength higher than 3/5. Lastly ASIA-E or normal that means sensory and motor functions are normal in all segments. A complete injury means complete loss of motor and sensory functions at the distal level of injury whereas incomplete damage is defined as the partial preservation of sensory and motor functions below the neurological level and in the lower sacral regions. There is a strong association between functional status and whether or not the injury is complete, as well as the extent of the injury (Nas et al. 2015).

However, spinal cord injury can be traumatic or non traumatic (New et al. 2012) and complete or incomplete (Nas et al. 2015), it can cause permanent neurological dysfunction which is associated with a significant social and economic burden (Ahuja et al. 2017), such as serious neurologic impairments (Hachem, Ahuja and Fehlings, 2017), systematic complications (Sweis and Biller, 2017), adverse impact on quality of life (Andresen et al. 2016). Besides these long time treatment and rehabilitation process (Fann et al. 2011), ultimately impact on mental health of a SCI patient (Wan et al. 2020).

Following a spinal cord injury (SCI), depression is one of the most prevalent mental health issues. Up to 40% of patients develop depression while receiving treatment, and 1 in 5 persons experience depression a year following the injury. After SCI, depression can be a significant issue. It can obstruct healing and rehabilitation, and is linked to lengthier hospital stays, more intense pain, and a poorer quality of life following injury (Mehta et al. 2020).

Depression prevalence rates vary significantly among studies, with higher rates observed after stroke compared to general medical population, but a wide range of possible population values is considered (Williams and Murray, 2015). According to a recent meta-analysis, the mean prevalence rate of depression after spinal cord injury (SCI) is 22.2% (Hearn and Finlay, 2018). Inpatients and community residents both have a range

of 9.8% to 63.9% likely depression prevalence following SCI. Depression symptoms linked to SCI-related issues, including reduced functional independence, secondary complications, and lower motor scores. Untreated depression negatively impacts quality of life and daily functioning in individuals with spinal cord injury (SCI). High prevalence and negative impact require early identification and treatment to reduce suffering and impairment (Khazaeipour et al. 2015).

Anxiety is another mental health issue for after SCI. Adults with spinal cord injury experience anxiety, with 45% reporting excessive worry, fear and panic (Rahnama et al. 2015). Post-SCI, symptoms of depression and or anxiety disorders are frequently described. Although there is a conceptual difference between depression and anxiety, practically separating the two conceptions has proven challenging because many persons who experience anxiety also experience depression. Compared to the general population, people who have had SCI generally suffer higher levels of distress and poorer levels of life satisfaction (Robert and Zamzami, 2013).

Rehabilitation process of SCI is long length, expansive and exhausting which causes biophysical, psychosocial and economic problems. Treatment for patients with spinal cord injuries is an ongoing process that lasts for many years and begins soon after the injury with acute care and early surgical interventions; after that, treatment for sensory, motor, and autonomic dysfunction in the chronic phase; and finally, lifelong treatment in the home environment (Nas et al. 2015).

Physical rehabilitation requires a patient to invest significant physical, emotional, and cognitive effort. Both modern and conventional rehabilitation techniques have been successful in delivering beneficial interventions to improve the patient's motor potential (Weller and Baker, 2011).

Healthcare practitioners in the field of rehabilitation should be aware of the typical mental health issues and symptoms associated with spinal cord injury (SCI) as well as how to collaborate with rehabilitation psychologists to maximize rehabilitation progress and raise overall QOL for people with SCI. Untreated distress can have harmful effects on the outcomes of rehabilitation and overall quality of life (QOL). While many

psychological reactions to receiving a SCI indicate natural adaptation and processing a significant life change. Assessment for mental health problems is necessary since distress can lead to decreased functional gains during initial rehabilitation treatment, more follow-up care and medical co-morbidities, as well as decreased health and functioning (Schultz, Mona and Cameron, 2022).

1.2 Rationale

Spinal cord injury (SCI) is a devastating and life-threatening condition which affects every facet of life. Globally about 15 - 40 people per million persons are affected in one year. Spinal cord injury is a depraved condition that can lead to physical, mental and social disabilities (Smith et al. 2013). Mood, emotion, discomfort, and life satisfaction are all examples of mental health. When compared to the general population, those with SCI have higher levels of distress and lower levels of life satisfaction.

After SCI psychological issues such as depression and anxiety are very common. Anxiety and depression are significant medical conditions that have an impact on thoughts, feelings, physical health, and behaviors. Symptoms of depression and anxiety disorders are frequently observed following a spinal cord injury. Individuals with SCI have a higher level of depression and anxiety, which reduces their quality of life further. Changes in resilience as a result of SCI are also thought to be related to life satisfaction, depression onset, and functional independence during inpatient rehabilitation after SCI. Still there is no study about the relationship in between depression and anxiety with fitness session following SCI in Bangladesh. Depression and anxiety have been found to have a major impact on health, lower performance of activities of daily living after SCI. From this study Physiotherapist will get an idea about the level of depression and anxiety that the patient will have after spinal cord injury and the relation in between mental health and fitness sessions after SCI. Improvement of mental health which enhance quality of life is the goal of all health promotion, treatment and service provision for people with disabilities. The study will help professionals to provide better quality service to these patients in future.

For minimizing the impact of depression and anxiety, it must be correctly identified and successfully treated. By this study Physiotherapist and other professionals will be aware about the effect of mental health of fitness sessions on Bangladeshi perspectives.

1.3 Study Objectives

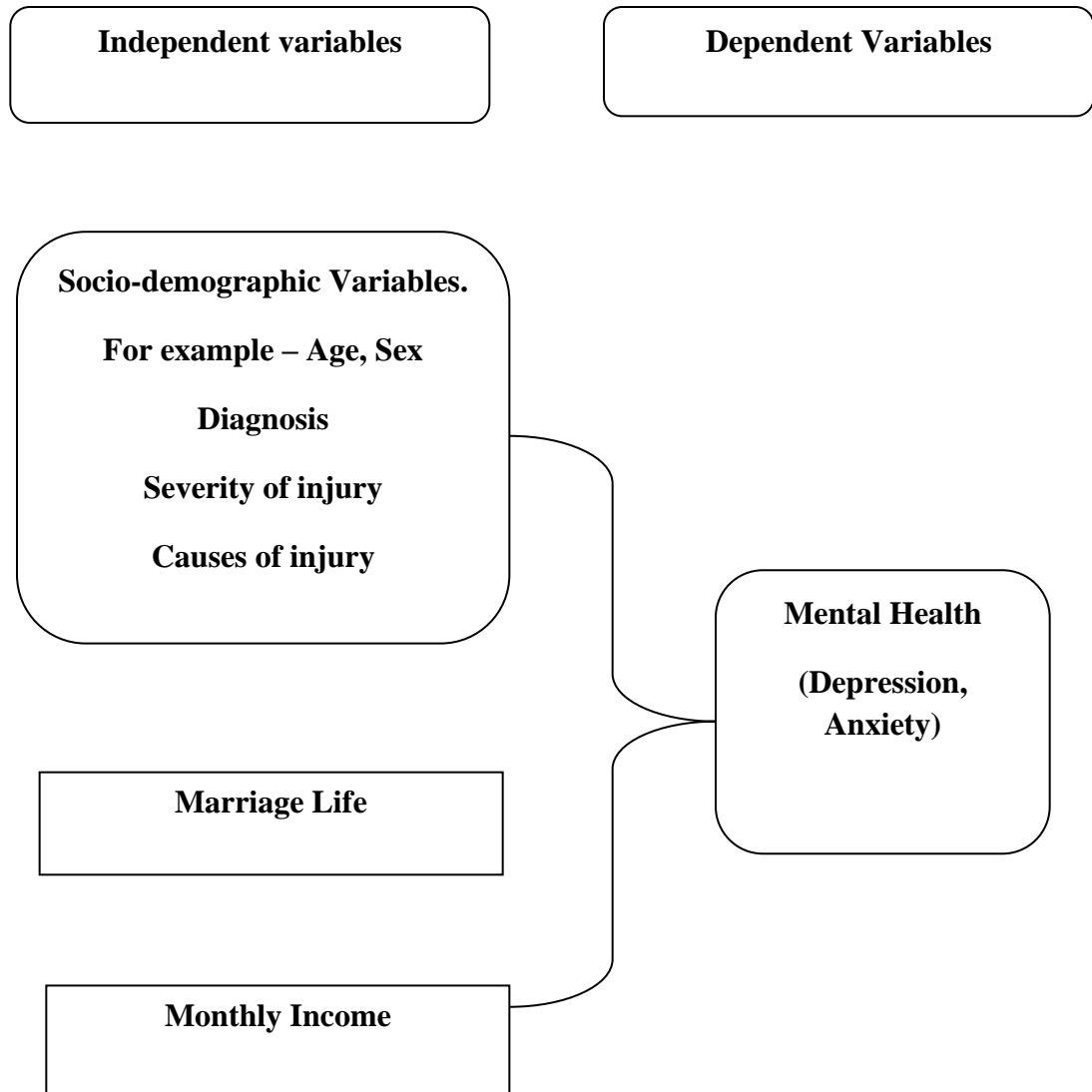
1.3.1 General Objectives

- The study aim is to explore the mental health status of spinal cord injured patients after attending a fitness group.

1.3.2 Specific Objectives

- To explore the level of depression and anxiety of spinal cord injured patients at CRP after completing the fitness session.
- To find out association among mental health status and socio-demographic information (age, sex, types of injury, cause of injury, severity of injury etc.).

1.4 Conceptual Framework



1.5 Operational Definition

Spinal cord injury

Spinal cord injury (SCI) is defined as damage to the neural elements in the spinal canal (spinal cord and cauda equina) which can be traumatic or non-traumatic that results in temporary or permanent loss of motor and/or sensory function.

Mental health

The ability to manage life's stressors, reach one's full potential, learn and work effectively and give back to one's community is known as mental health. Mental health includes our emotional, psychological, and social well-being.

Depression

Depression is a low state of mood and unwillingness to activity that can affect a person's thoughts, behavior, feelings and sense of wellbeing.

Anxiety

Anxiety is your body's natural response to stress. It's a feeling of fear or apprehension about what's to come.

Fitness Session

Fitness session is a specialized session for SCI patients in which patient can enjoy music therapy which is a clinical approach by using music interventions to achieve individualized goals, conducted by a certified professional who has completed an approved program.

A spinal cord injury (SCI) is a serious, long-lasting disorder that frequently results in paralysis, a wide range of secondary consequences, functional limitations, and unrelenting pain. This kind of damage is one of the most traumatic ones a person can suffer because it has deep and irreversible effects on many facets of life. Spinal cord injured people deal with a variety of daily difficulties, such as interference with job, family and social relationships and community involvement. Moreover, up to 30% of people with SCI report clinical levels of anxiety and depression at some time after their injury, along with lower life satisfaction and limited social participation. Consequently, mental distress is frequent in SCI and has been demonstrated to last for at least ten years after the damage (Aaby et al. 2020).

More than a million people worldwide suffer from spinal cord injury (SCI), which is primarily brought on by severe trauma from car accidents, slips and falls, and sports-related injuries. SCI includes two unique mechanisms. The first is the main injury brought on by the compression and contusion of the spinal cord, which results in the destruction of neuronal and glial cell membranes as well as the disruption of the microvasculature at the time of injury. The other is the secondary damage cascade, which takes hours to months to develop and involves excessive gliosis, inflammation, cytotoxic free radical and excitotoxic chemical formation, and tissue swelling from bleeding and edema (Yamazaki et al. 2020).

United States of America, with 906 per million people, has the highest prevalence of SCI worldwide (Huang et al. 2020). Incidence rates in affluent nations varied from 13.1 to 163.4 per million people. The rates for underdeveloped nations ranged from 13.0 to 220.0 per million inhabitants (Kang et al. 2018).

Every year, between 250,000 and 500,000 people are affected by the devastating neurological disorder known as spinal cord injury (SCI), and two to three million people worldwide are thought to be living with a handicap as a result of their SCI (Quadri et al. 2020).

Spinal cord injuries occur more frequently than before, with 15–40 incidents per million people each year. Globally, it is anticipated that there will be 40 to 80 new cases of spinal cord injury (SCI) per year (New et al. 2014). The National Spinal Cord Injury Association estimates that up to 450,000 Americans are dealing with spinal cord injuries (SCI). According to estimates, there are 11,000 SCIs every year in the United States (American Association of Neurological Surgeons, 2017) and between 10.4 million and 29.7 million SCIs per year are reported in Europe (Moghimian et al. 2015). Asia has SCI incidence rates ranging from 12.06 to 61.6 per million (Ning et al. 2012). The incidence rate, however, is 27.1 per million per year in Asia after 3 years, according to other literature (Moghimian et al. 2015). SCI acceptance in society can impact anybody, but men, especially dynamic young men, are more prone to become victims (Craig, Tran and Middleton, 2015). The International Spinal Cord Society (ISCoS) has just started a global mapping project to build a framework for an ongoing data repository to educate stakeholders about the development and coordination of prevention strategy. In contrast to Canada's incidence rate of 35 per million, the identified SCI incidence rate in the United States is 39 per million. Despite being much higher than Western Europe (16 per million) and Australia (14 per million) (15 per million), it is still lower than the global average. (Cripps et al. 2011).

A study conducted at CRP in Bangladesh showed that the most vulnerable age groups, which made up 55.6% of the population, were those between 20 and 40 years old. SCI was more common in people over 50 and occurred less frequently in people under 20. The 158 individuals had an injury rate of 86.1% traumatic and 13.9% non-traumatic, leading to 79.75% paraplegia and just 20.25% tetraplegia. It was discovered that the average life expectancy was 5.36 years. Overall, of those admitted with SCI, 56.4% passed away within 5 years, whereas 43.6% survived for 5 years or longer. The greater rate of SCI patient fatalities at home in the current study may be a result of poor social acceptance of these patients, inadequate reintegration into society, a lack of optimal home care, and poor quality of life after hospital discharge (Razzak et al. 2011).

The majority of SCI clients are men, while the ratio varies greatly across industrialized and developing nations. In affluent nations, the male to female ratio goes from 2.5:1 to

4.3:1 with a frequent age group of 20-49. In poor nations, it ranges from 2.34:1 to 9:1. This study discovered 16.6% non-traumatic SCI cases and 83.4% traumatic SCI (TSCI) cases. RTA and falls are two of the main causes of SCI.(60.3%) in the current study. The majority of falls in Bangladesh happen at work, either at home when doing housework or maintenance, or at the job while picking fruit, gathering firewood from trees, working with electricity, doing construction, etc. (Razzak et al. 2016).

SCI can happen in a matter of seconds, but the lifelong ramifications can be severe. People in Bangladesh are exposed to TSCI because of the way they live. A study done with 56 participants showed that the affected SCI were male 84.0% and female were 16.0% and children were 5.4%. In this study, the most common cause of injury (50%) was falling from heights ((Razzak et al. 2013).

In Bangladesh, 60% of traumatic spinal cord injury lesions are paraplegics, 40% are tetraplegics, and 84% are paraplegics. Non-traumatic SCI cases have various causes, including falling from heights, carrying a heavy burden on the head, spinal TB, road traffic accidents, falling objects, Guillain-Barre Syndrome, and Transverse Mellitus (Razzak et al. 2016).

A severe impairment may result from a spinal cord injury (SCI); In both boys and girls, adolescence and the early years of adulthood are the times when the risk of SCI is highest, with a roughly 4:1 ratio between the sexes; A considerable negative impact on mental health can be caused by spinal cord injury; Having an emotional illness like depression following SCI is a risk that will inevitably occur (Guest et al. 2014).

Spinal cord injury (SCI) is a severe medical ailment that results in functional, psychological, and economical disruption. The continuum of treatment for people with SCI includes long-term, secondary medical issues often and in a significant way. In addition to increasing the likelihood of readmission to the hospital, lowering one's employability, and degrading one's quality of life, complications are a common cause of morbidity and mortality. Significant limitations in many facets of life are experienced by SCI patients. The objectives of rehabilitation and other SCI treatment options are to increase health-related quality of life, lower secondary morbidity, and improve functional

level. Patients with SCI may have both short-term and long-term secondary medical issues. The functional independence and quality of life of patients are yet further adversely affected, particularly by chronic problems. Therefore, it is essential to prevent, detect, and treat chronic secondary problems in patients with SCI as soon as possible in order to reduce them, increase survival, community engagement, and health-related quality of life (Sezer, Akkus and Ugurlu, 2015).

A substantial risk of morbidity and mortality is associated with spinal cord injury (SCI), a condition that can be fatal. Numerous epidemiological investigations have been conducted in various locations across the world. The incidence of SCI varies between 9.2 and 56.1 cases per million, and this variation is impacted by the region's social, economic, geographical, demographic, and political variables in addition to research methods. India is the second most populated nation in the world. However there are currently no demographic statistics available for SCI (Mathur et al. 2015).

Spinal cord injury (SCI) is a severe condition causing pain, disability, loss of function, and neurologic dysfunction. It can occur acutely or chronically, with the highest prevalence in the US at 906 per million. Complications like pneumonia, septicemia, urinary tract infections, and chronic pain can increase the severity of SCI and lower its quality of life. After SCI, psychological issues may develop in addition to physical damage. SCI patients may develop persistent depression or anxiety as a result of their injuries (Lim et al. 2017).

Many survivors of SCI also experience serious psychological, psychosocial, and neurobehavioral problems and are more likely to develop anxiety disorders, substance abuse issues, feelings of helplessness, inadequate coping mechanisms, low self-esteem, and depression. SCI results in diminished mobility greatly reduced functional independence, and difficulties with socialization and employment (Arango-Lasprilla et al. 2011).

Depression is common mental health issue and disabling after spinal cord injury (SCI). Major depressive disorder (MDD) affects about 30% of patients with SCI during the acute rehabilitation phase, and 25–30% report substantial depressed symptoms during the

chronic phase. In contrast, serious depression is present at a point prevalence of 10% in primary care settings and is present at a one-year prevalence of 6.6% in the US population. In contrast, serious depression is present at a point prevalence of 10% in primary care settings and is present at a one-year prevalence of 6.6% in the US population. Significant depressive symptoms after SCI are associated with lower self-esteem, fewer leisure activities, less community mobility, less social integration, and fewer fulfilling social activities. These findings imply that it should be a top priority to recognize and treat depression during acute SCI rehabilitation (Fann et al. 2013).

Depression can be characterized as a sensation of sadness, blueness, unhappiness, misery, or dejection. Most people experience these feelings occasionally for brief periods of time. A mood illness known as true clinical depression occurs when emotions of sorrow or sadness, loss of interest, decreased energy, disturbed sleep, disturbed appetite, poor concentration, anger, or frustration interfere with daily life for weeks or more (Ducharme et al. 2012).

Individuals with depression almost always express negative ideas and beliefs, such as learned helplessness, decreased self-efficacy and self-control, distorted perceptions of SCI-related disability, increased stress, less vocational interests and abilities, and a diminished sense of optimism. There is little doubt that depression has a major effect on the affected people and their families, regardless of the prevalence and natural history of the condition among people with SCI (Orenczyk et al. 2010).

The way depression symptoms are recognized in patients and theories surrounding its etiology can affect their willingness to seek help and consent to treatment, as well as the attitude and behavior of the community towards them. People with depression are frequently stigmatized by society, and only a few receive proper treatment (De Almeida et al. 2013).

Depressive disorders must therefore be treated because they can have a negative impact on a person with a spinal cord injury's ability to function in daily life. For example, depressive disorders can make pain worse, make it difficult to sleep, sap one's energy,

take away from one's enjoyment of life, and make it challenging to take care of one's health (Arango-Lasprilla et al. 2011).

The process of physical recovery is hampered by depression, which also makes spinal cord injury-related physical health issues worse. The estimated prevalence of depression varies greatly between studies. Study showed that the estimated mean prevalence of depression after SCI was 22.2% (Williams and Murray, 2015). Among hospital patients and community residents, the prevalence of probable depression following SCI ranged from 9.8% to 63.9% (Khazaeipour et al. 2015). A study showed that an estimated 18.7%–26.3% of SCI survivors were diagnosed with depression (Williams and Murray, 2015). People with SCI had a 30% chance of accompanying depression during the rehabilitation phase, compared to 27% in the general population. According to the definition of depression, the length of the research, and the period since the injury, depression is often reported to affect 20% to 40% of people (Craig, Tran and Middleton, 2015). When compared to samples of individuals without disabilities, SCI patients have a 4-fold higher risk of depressive disorders, with an overall depression rate of 42% and a probable major depression rate of 21% (Shin et al. 2012).

Schonenberg et al. (2014) reported that Almost half of the patients (46.1%) have depressive symptoms right after discharge, and 12.7% showed scores indicating a current depressive disorder.

Stanford et al. (2007) reported more than 1 in 10 participants had a risk of having co-occurring psychological disorders six months after discharge, and at least 1 in 5 participants had a significant chance of developing a psychological illness. The two most common psychological disorders identified were major depressive disorders and drug use disorders. It was concerning that a sizable portion of those with depression were also labeled as being at risk of self-harm given the high rates of suicide in this group.

Depression has been associated with lengthier rehab stays, fewer functional improvements, and decreased functional independence and mobility after discharge. The likelihood of developing pressure ulcers, one's own assessment of one's health, the number of days spent in bed, the need for professional personal care, and role

performance all increased with depression. The likelihood of severe depression following spinal cord damage predicted all-cause death (Hagen et al. 2012).

Arafat et al. (2018) reported in their study that 64% of the SCI patients had moderate depression with the injury level of Complete A. Shin et al. (2012) showed that Complete A and B had higher rates of depression at 8.02%. Khazaeipour et al. (2015) informed that Khazaeipour et al. (2015) found that patients with tetraplegia had a high 62.2% frequency of depression.

Anxiety is an issue for adults with acquired spinal cord injuries (SCI). Up to 45% of injured people report having excessive concern, fear, or panic, which increases their chance of developing disorders like generalized anxiety disorder. The traumatic character of some SCIs, continuous worry about secondary, potentially fatal effects (such as autonomic dysreflexia), or psychological morbidity from before the injury can all contribute to increased anxiety. Following SCI, it is critical to accurately and promptly measure psychological distress since clinically meaningful symptoms may compromise functional recovery (Lee et al. 2016).

Anxiety and its symptoms are linked to interference with daily living and utilization of medical services. Muscle tenseness, soreness, restlessness, and fatigue are signs of anxiety (Amiri and Behnezhad, 2019). According to estimates, 22-28% of people with SCI have clinical depression; Around 20% of people experience clinical anxiety; and approximately 12% of people suffer from posttraumatic stress disorder (PTSD); While rates of clinical depression, anxiety, and PTSD are, respectively, around 7%, 3%, and 3.5% among the general adult population in the USA (Schultz, Mona and Cameron, 2022).

People who have spinal cord injuries (SCI) deal with difficulties with their social functioning, mental health, and physical well-being. Systematic evaluations estimated that 22% and 27%, respectively, of this group suffer from depressive mood and anxiety issues. There are no changes in terms of mental health, but overall life satisfaction is lower in people with tetraplegia than in people with paraplegia (Scholten et al. 2018).

The most devastating and disruptive occurrence that may happen to anyone in their life is a spinal cord injury (SCI). SCI presents enormous difficulties in terms of both coping and recovery. Depending on how severely it damages the limbs, trunk, pelvic organs, bladder, intestine, and sexual organs, SCI can result in quadriplegia or paraplegia. Due to this loss of function, the affected person's life is significantly altered and regular work, social, sexual, and leisure activities become impossible. Enabling the SCI patient to improve their quality of life is the primary objective of all rehabilitation programs (Kumar and Gupta, 2016).

A study conducted at CRP showed (2017) that spinal cord injured patient being satisfied by taking or participating in a balance group and improved their quality of life and increased community re-integration.

SCI is mostly brought on by external trauma and has the ability to unexpectedly change the injured person's life, interfering with employment, recreation, and social activities. Any trauma to the medullary canal's structures that results in temporary or permanent changes to or losses of motor, sensory, autonomic, and mental functions is the cause of it. Individuals with spinal cord injury (SCI) now live longer than they did in the past. However, the death rate among people with SCI continues to be significant. It's probable that health rehabilitation and treatment techniques have evolved, and that this evolution is directly responsible for the rise in life expectancy. The evolution of rehabilitation has been marked by a shift in its ultimate goal over time: from increasing life expectancy in the past to focusing on functional independence and quality of life now (Rodrigue et al. 2020).

3.1 Study Design

Cross-sectional studies were carried out at one time point or over a short period. Cross sectional study was selected by researcher to carry out the research. In this study a cross sectional study design used to find out the mental health status among the patient with spinal cord injury. This study design was appropriate to find out the objectives. The data was collected all at the same time or within a short time frame. A cross-sectional design provides a snapshot of the variables included in the study, at one particular point in time. My study duration was from 3rd May to 7th July.

3.2 Study Site

Data was collected from patients with spinal cord injury attending at Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka in SCI Unit; the only specialized & largest hospital in Bangladesh .

3.3 Study population and sample population

A population is the total group or set of events or totality of the observation on which a research is carried out. In this study the people who had SCI and people who were receiving treatment and rehabilitation was selected to carry out the study. 110 patients can be admitted at a time in SCI unit at CRP. Among them 50 patients are being selected for this study who are in rehabilitation stage and who participate in fitness group.

3.4 Sampling Technique

Sample was selected through convenient sampling method for conducting this study. A convenience sample is a group of individuals who (conveniently) were available for study.

3.5 Sample Size

Sampling procedure for cross sectional study done by following equation-

$$n = \frac{z^2 \times pq}{d^2}$$

Where, Here, Z (confidence interval) = 1.96

P (prevalence) =50% (Geyh et al. 2010)

And, q = (1-p)

$$= (1-0.5)$$

$$= 0.5$$

d is the desired level of precision (i.e. the margin of error).

Sample size:

$$n = \frac{z^2 \times pq}{d^2}$$

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2}$$

$$= 384.16$$

$$= 384$$

The actual sample size was, $n = 384$. As it is an academic thesis, self-funding and data was collected from a single specialized hospital by considering the feasibility and time limitation 50 sample were selected conveniently.

3.6 Data Collection Tool

“Patient Health Questionnaire (PHQ-9)” and “Generalized Anxiety Disorder (GAD-7)” were selected to collect data. Mental health measurement tool is an established tool at SCI-related research; assessing mental health by using the PHQ-9. The PHQ-9 questionnaire was developed in the context of overall level of depression and overall rate of mental health status. GAD-7 was developed in the context of level of anxiety. Some other necessary materials like pen, pencil, and white paper, clip board & note book are also needed.

3.7 Data Collection Procedure

For this study researcher collected data from the participants by following the instructions given on the "PHQ-9" and “GAD-7). This data collection tools were permitted from the authors to use this study. Participants who had the reading ability they administered questionnaire own-self. Before collecting data the study aims and purpose explained to the participants. The participants or careers read (if they can) the information sheet and consent form. Who were unable to read researcher was explained the information sheet and the consent form. All the participants had the opportunities to ask any study related questions and they could show interest to participate in the study they could sign in the consent form willingly. The researcher was collected data by structured questionnaire, pen, pencil and paper.

3.8 Data Analysis

The researcher was analyzed data to find out mental health, the level of depression. The data was collected and analyzed by using statistical package for social sciences (SPSS). Researcher analyzed the data by descriptive statistics using Frequency, Percentage (%), Pie diagram, Bar diagram, and also shown the association by non-parametric test which was Chi-Square test.

Chi square (χ^2) Test

Chi square (χ^2) Test is the most popular discrete data hypothesis testing method. It is a non-parametric test of statistical significance for bivariate tabular analysis with a contingency table. In this study Chi square (χ^2) test was done to measure the associations between two variables. It was used to test the statistical significance of results reported in bivariate tables.

Level of significance

The researcher has used 5% level of significant to test the hypothesis. If the p value for the calculated χ^2 is $p < 0.05$ conclude that there is significant association between the two variables.

3.9 Inclusion Criteria

- Patients who were in rehabilitation stage.
- Patients who were admitted and completed eight weeks of fitness session at CRP.
- Information was taken only form the clients.
- Both male and female patients with SCI.
- Patients who willingly participate in the study.

3.10 Exclusion Criteria

- People who had SCI with psychological disorders.
- SCI patients with severe head injury.
- SCI with speech problem & medically unstable patient.
- Patient with cognitive problem.
- Patient suffering from serious pathological disease e.g. tumors, tuberculosis, TM etc.

3.11 Ethical Consideration

The researcher maintained some ethical considerations: Researcher has followed the Bangladesh Medical Research Council (BMRC) guideline & WHO research guideline. A research proposal was submitted to the physiotherapy department of BHPI for approval and the proposal was approved by the faculty members and gave permission initially from the supervisor of the research project and from the course coordinator before the study. The proposal of the dissertation including methodology was presented to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for oral presentation defense was done in front of the IRB. Then the necessary information was approved by Institutional Review Board and was permitted to do this research. After getting the permission of doing this study from the academic institute the researcher had been started to do it. The researcher had been taken permission for data collection from the SCI unit of Savar, CRP. The participants would be informed before to invite participation in the study. A written consent form used to take the permission of each participant for the study. Researcher also ensured that the organization (CRP) was not hampered by the study. All kinds of confidentiality highly maintained. The researcher ensured not to leak out any type of confidentialities. The researcher was eligible to do the study after knowing the academic and clinical rules of doing the study about what should be done and what should not. All rights of the participants were reserved and researcher was accountable to the participant to answer any type of study related question.

3.12 Informed Consent

Informed consent relates to a state of affairs in which all potential participants receive and understand all the information they need to decide whether they want to participate. This includes information about the study's benefits, risks, funding, and institutional approval. In this study a written consent was given to all participants before the completion of the questionnaire. The investigator explains to the participants about their role in this study. He also explained what type of questions they would be asked and also informed that they are free to ignore questions as their wish. He also assured that he didn't foresee any risks or discomfort from their participation. Written consent (appendix) was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study and aim & objectives of this study. The researcher read the informed consent to the participants. Those who were literate was encouraged to sign the form. The researcher received a written consent from every participants including signature. Those who were illiterate, verbally consent was taken from them. Patients who were not that much cooperative, the career were explained the entire process. So that they can understand about the consent from and their participation was on voluntary basic. The aims and objectives of this study must be informed to the subjects verbally. So, gave the consent from to the subject and explained them.

The subjects had the rights to withdraw themselves from the research at any time. It supposed to assured the participants that their name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or writing but they would not be identified. The participants informed by the researcher that the result would not be harmful for them. Ensuring the confidentiality of participant's information, no information has been shared without the research supervisor. At any time the researcher available to answer any additional questions in regard to the study.

3.13 Rigor of the study

The rigorous manner was maintained to conduct the study. The study was conducted in a clean and systemic way. During the data collection it was ensured that participants were not influenced by experience. The answer was accepted whether they were in negative or positive impression. No leading questions were asked. The participant information was coded accurately checked by the supervisor to eliminate any possible errors. The entire information was handled with confidentiality. In the result section, outcome was not influenced by showing any personal interpretation. Every section of the study was checked & rechecked by research supervisor.

A Cross-sectional study was conducted to achieve the research objectives. About 50 samples were selected for this study. The main objective was to find out the assessment of mental health of people with SCI in rehabilitation stage attending at CRP.

4.1 Gender of the participants:

Among 50 participants, most of them were male 78% (n=39) and Female were 22% (n=11)

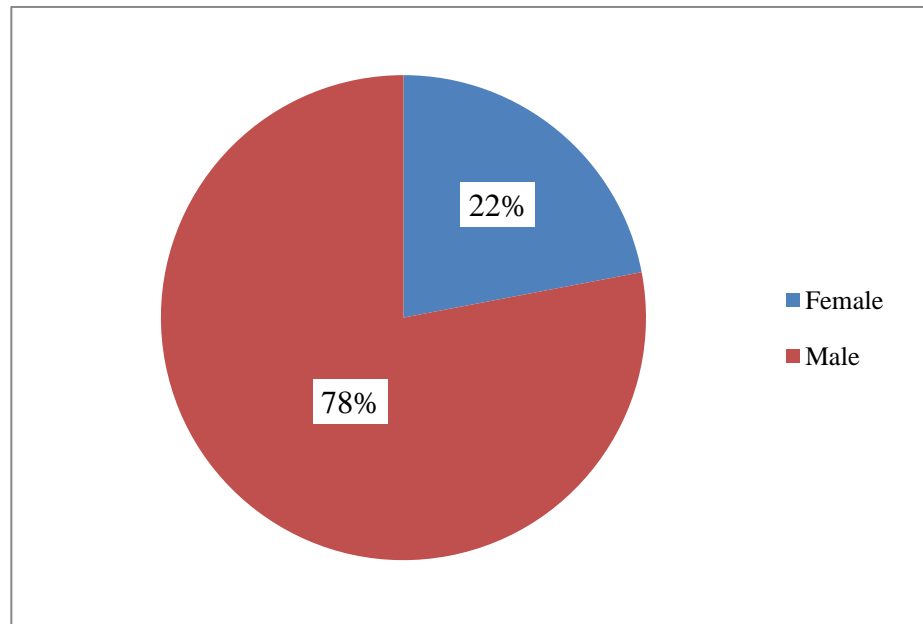


Figure 1: Gender of the participants

4.2 Age group of the participants

In this research, the mean of the age was 27.42, median was 26 and mode was 25. There were two age groups among 50 participants. The percentage of participants age of less than 40 years were 82% (n=41) and more than 40 years were 18% (n=9).

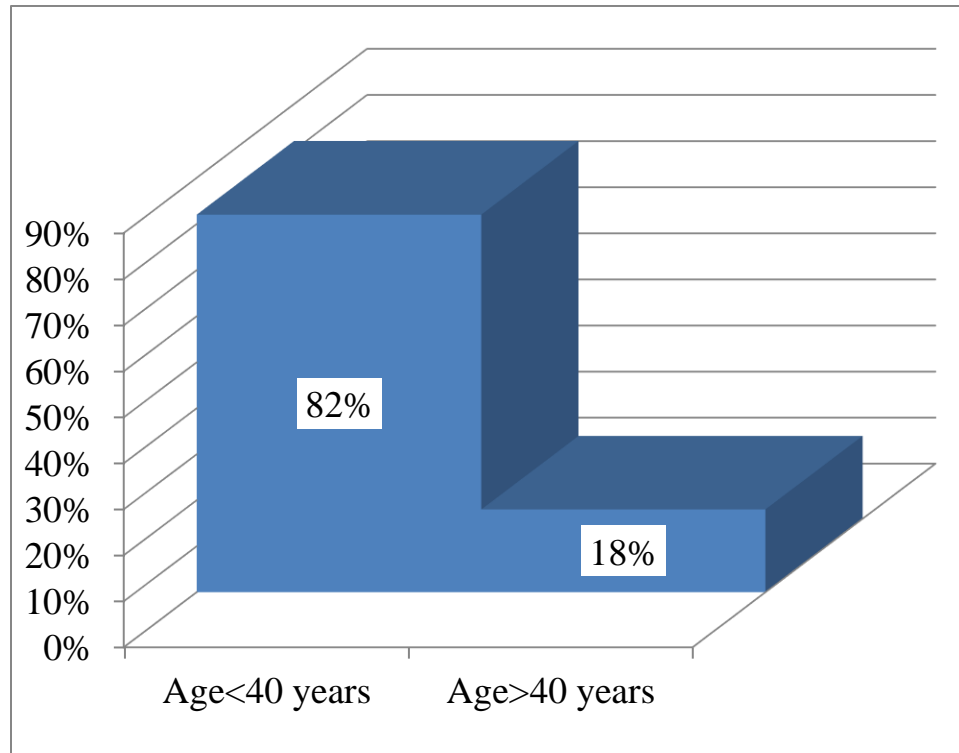


Figure 2: Age group of the participants

4.3 Types of paralysis of the participants

Out of 50 participants, there were little difference between the number of paraplegia and Tetraplegia; paraplegia were 62% (n=31) and tetraplegia were 38% (n=19).

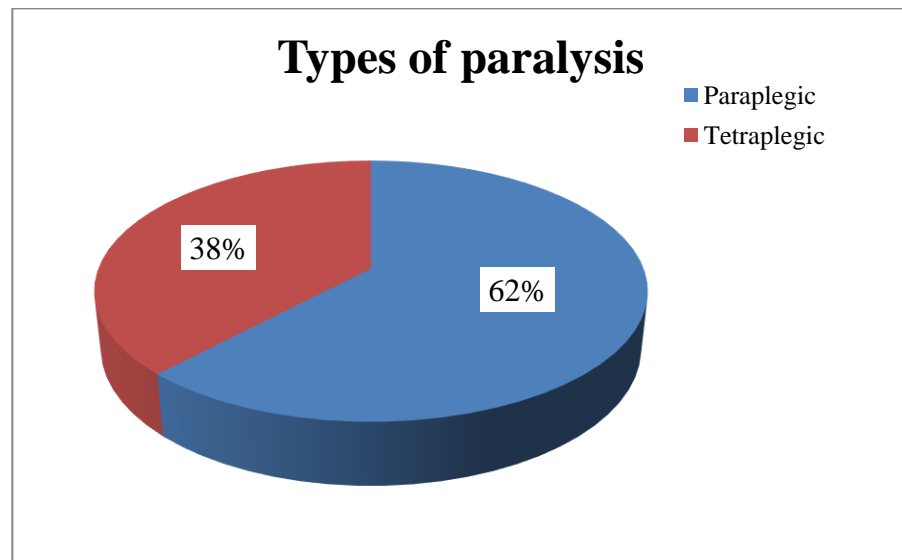


Figure 3: Types of injury of the participants

4.4 Marital status of the participants

Among 50 participants, most of them were married 62% (n=31) and unmarried were 38% (n=19).

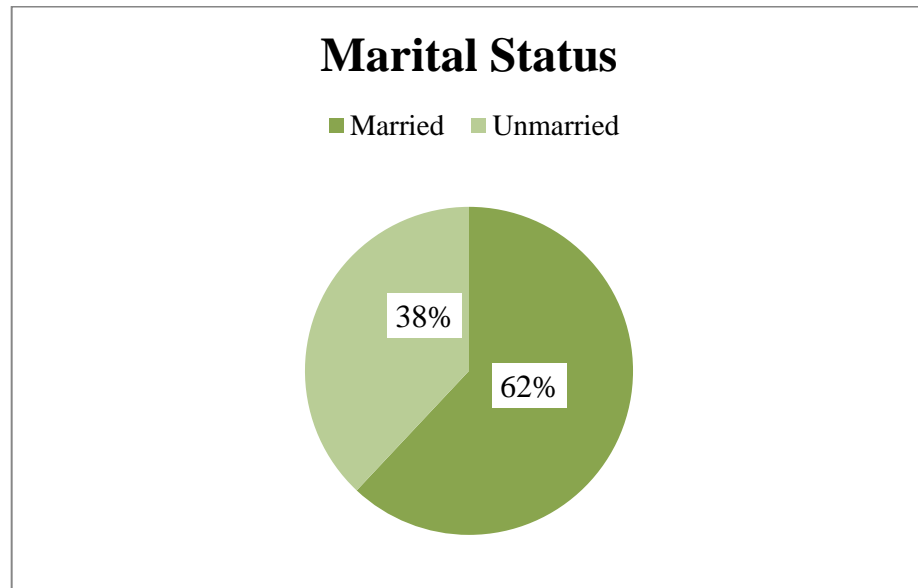


Figure 4: Marital status of participants

4.5 Education level

Out of 50 participants, Illiterate were 20% (n=10), Primary school certified were 30% (n=15), High school certified were 20% (n=10), Higher secondary School certified were 22% (n=11), Graduate or Post graduate were 8% (n=4).

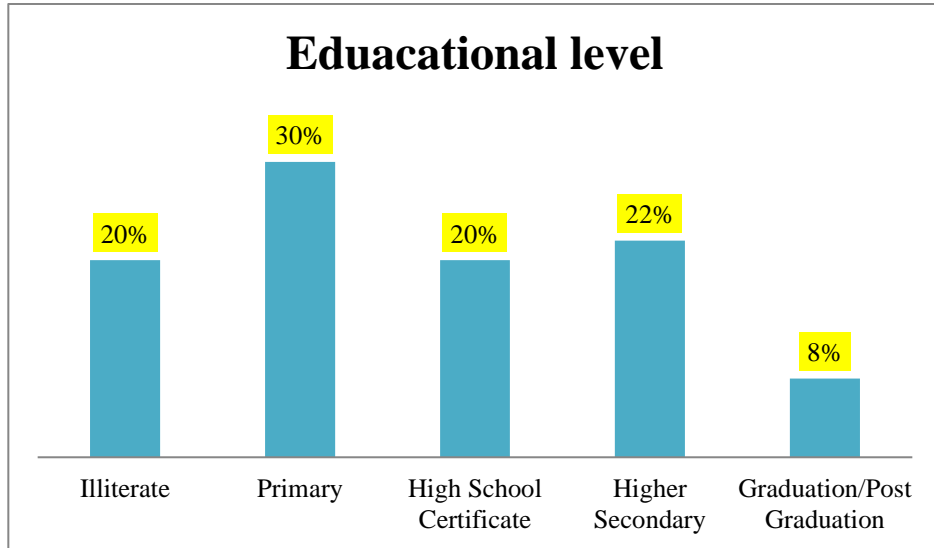


Figure 5: Education level of the participants

4.6 Occupation of the participants

There were participants of different occupation. Farmer were 16% (n=8), worker were 18% (n=9), driver were 6% (n=3), day laborer were 16% (n=8), housewife were 6% (n=3), Student were 38% (n=19).

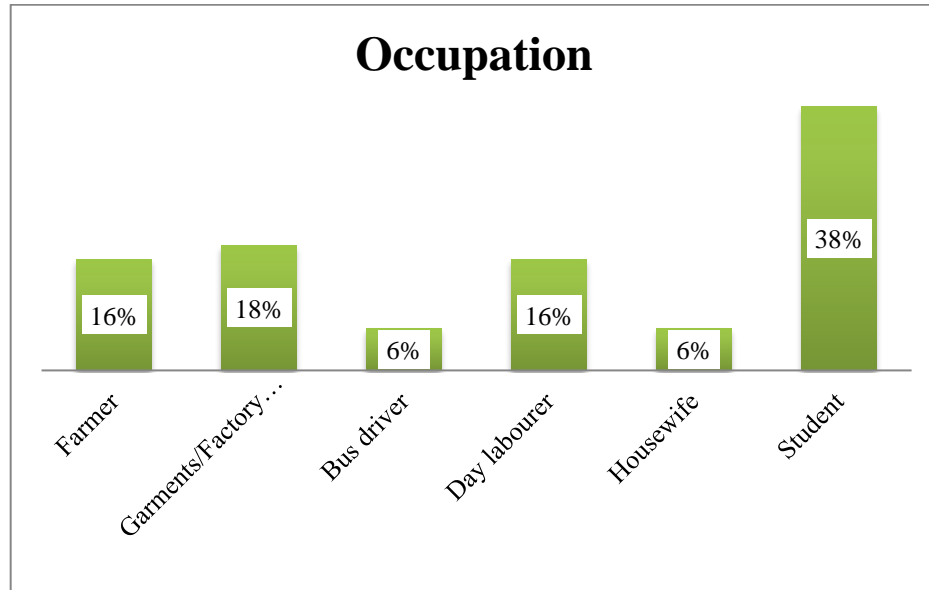


Figure 6: Occupation of the participants

4.7 Residential area of the participants

Among the 50 participants, participants live on rural area 72% (n=36), participants live on semi urban area 12% (n=6), participants live on urban area 16% (n=8).

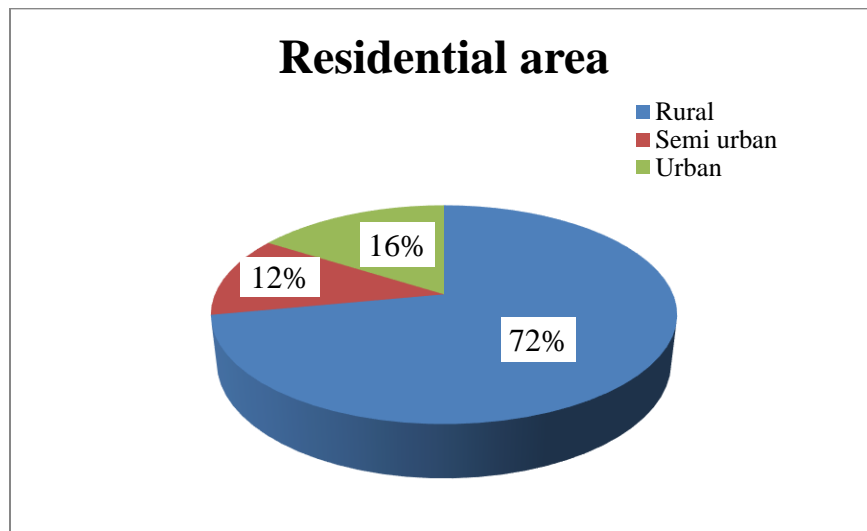


Figure 7: Residential area of the participants

4.8 Causes of injury

Among the 50 participants, maximum participants had faced spinal cord injury due to fall from height. The percentage of spinal cord injury due to fall from height were 40% (n=20), RTA were 30% (n=15), Fall during carrying heavy weight 16% (n=8), Heavy weight fall on back 6% (n=3), Sports injury were 2% (n=1), others were 6% (n=3).

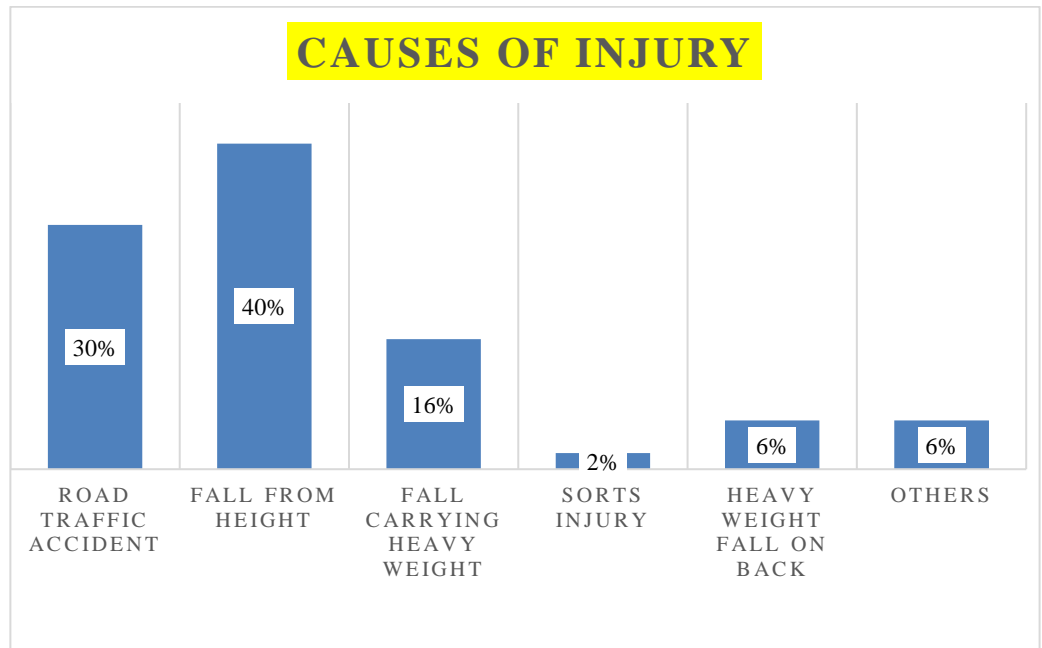


Figure 8: Causes of injury

4.9 Severity of injury of the participants

There were 50 patients who participate in this study. Most of them were incomplete C according to ASIA impairment scale. The percentage of incomplete C were 42% (n=21), complete A were 24% (n=12), incomplete B were 20% (n=10), incomplete D were 14% (n=7).

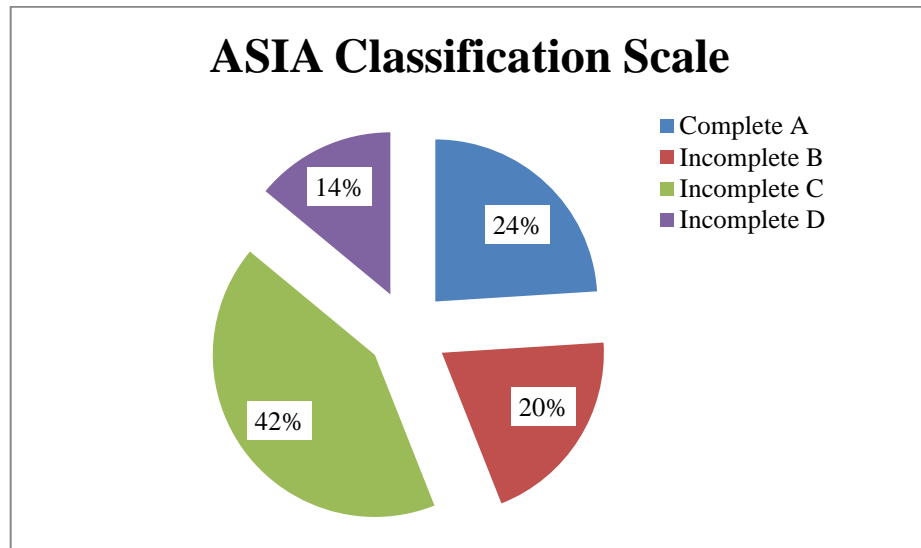


Figure 9: Severity of injury of the participants

4.10 Injury level of the participants

Among the 50 participants, injury occurred in the skeletal level mostly in L1-L5 level. The percentage of skeletal level of L1-L5 were 42% (n=21), C1-C8 were 36% (n=18) and T1-T12 were 22% (n=11).

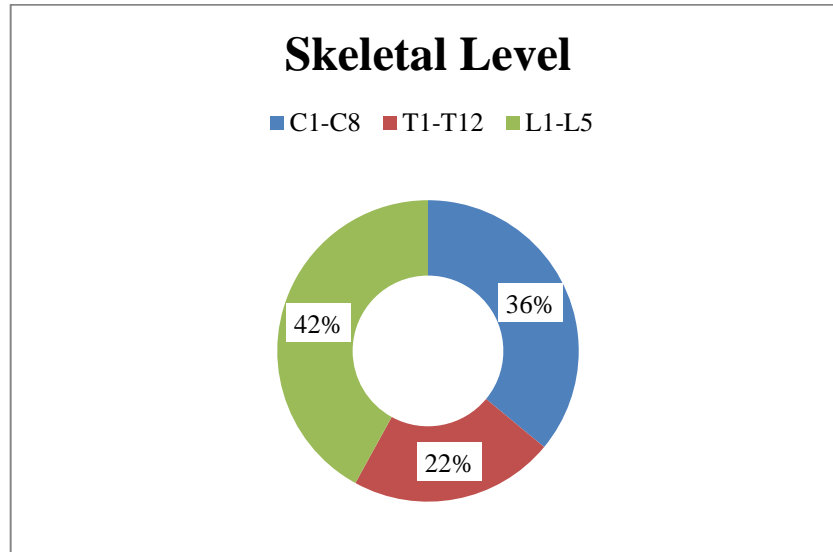


Figure 10: Injury level (skeletal level) of the participants

4.11 Neurological level of the injured participants

Among the 50 participants, the percentage was same in the cervical and lumbar region. The percentage of C1-C8 level were 34% (n=17), T1-T12 level were 32% (n=16) and L1-L2 level were 34% (n=17).

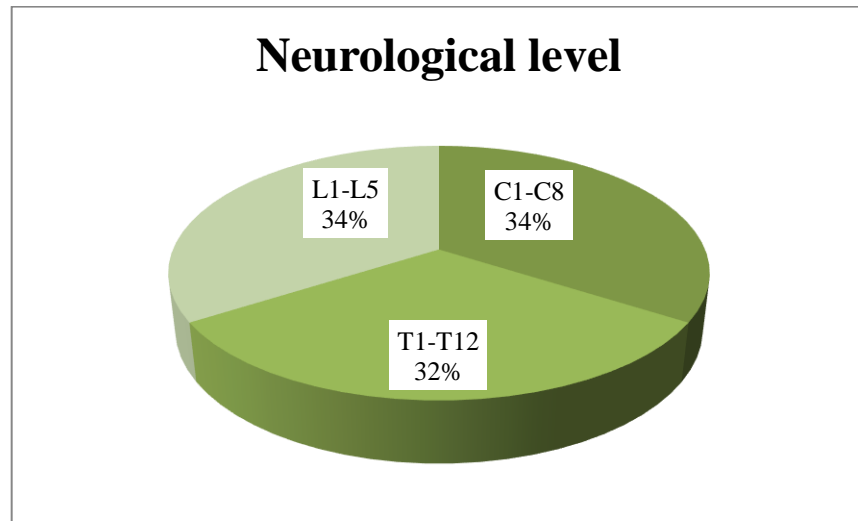


Figure 11: Neurological level of the injured participants

4.12 Monthly income of the participants

Among the 50 participants, about 60% of the participants monthly income were less than 15000 taka (n=30) and other 40% of the participants monthly income were more than or equal 15000 taka (n=20).

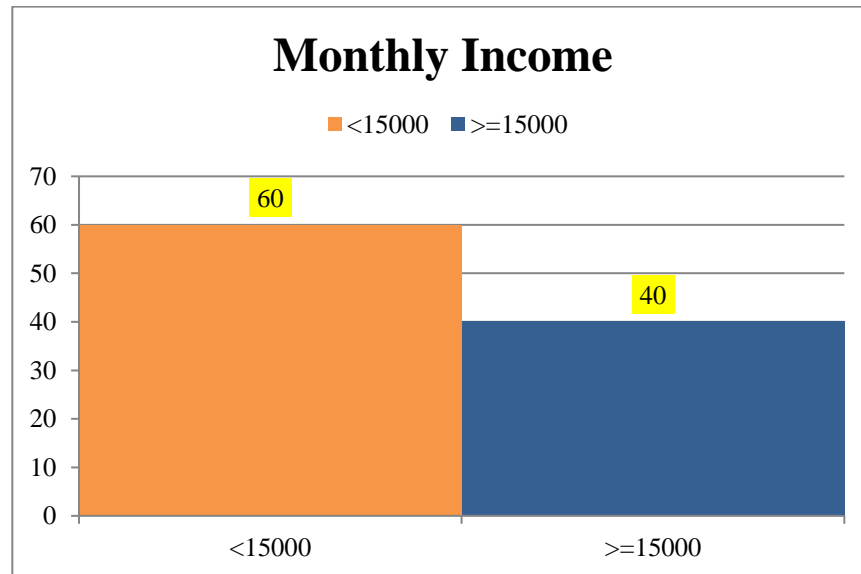


Figure 12: Monthly income of the participants

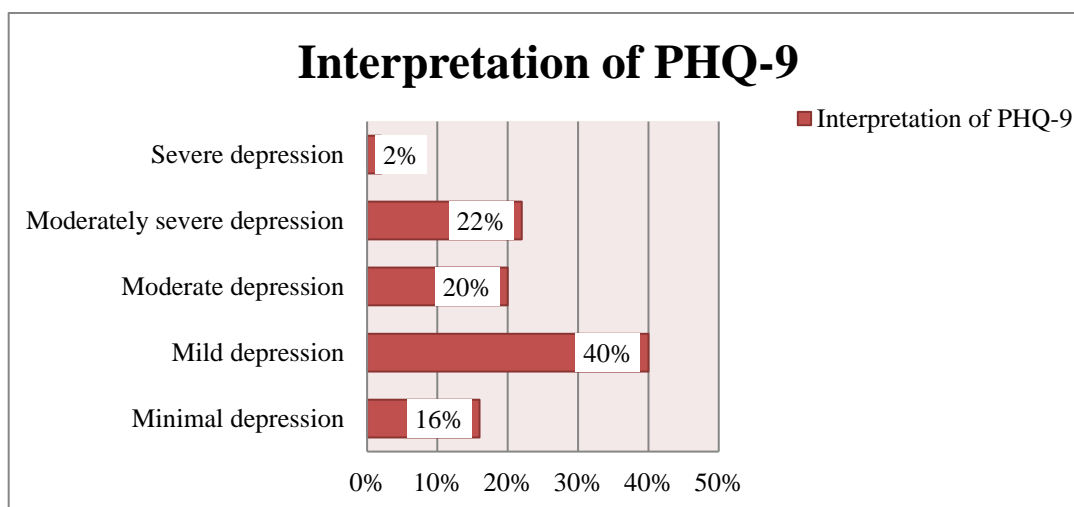
Table-1: Socio demographic information of all participants (n=50)

Variables	n (%)	Variables	n (%)
Age of the participants		ASIA Classification	
Mean	27.42	Complete A	12(24.0)
Median	26	Incomplete B	10(20.0)
Mode	25	Incomplete C	21(42.0)
Std. Deviation	10.027	Incomplete D	7(14.0)
<40 years	82%		
>40 years	18%		
Gender		Causes of lesion	
Male	39(78.0)	Road traffic accident	15(30.0)
Female	11(22.0)	Fall from height	20(40.0)
		Fall carrying heavy weight	8(16.0)
		Sports injury	1(2.0)
		Heavy weight fall on back	3(6.0)
		Others	3(6.0)
Marital status of the participants		Types of paralysis	
Married	30(60.0)	Tetraplegic	19(38.0)
Unmarried	20(40.0)	Paraplegic	31(62.0)
Educational qualification		Skeletal Level	
Illiterate	10(20.0)	C1-C8	18(36.0)
Primary	15(30.0)	T1-T12	11(22.0)
High School Certified	10(20.0)	L1-L5	21(42.0)
Higher Secondary	11(22.0)		
Graduation/Post	4(8)		
Graduation			
Residential area		Neurological Level	
Rural	36(72.0)	C1-C8	17(34.0)
Semi urban	6(12.0)	T1-T12	16(32.0)
Urban	8(16.0)	L1-L5	17(34.0)
Occupation		Monthly Income	
Farmer	8(16.0)	<15000	30(60.0)
Garments/Factory Worker	9(18.0)	>=15000	20(40.0)
Bus driver	3(6.0)		
Day labourer	8(16.0)		
Housewife	3(6.0)		
Student	19(38.0)		

Table-2: Interpretation of PHQ-9

Variable	Minimal Depression N (%)	Mild depression N (%)	Moderate depression N (%)	Moderately severe depression N (%)	Severe depression N (%)
Interpretation of PHQ -9 Total score	8 (16%)	20 (40%)	10 (20%)	11 (22%)	1 (2%)

Figure 13: Result of PHQ-9 total score interpretation of all participants (n=50). The X-axis shows the depression percentage of participants.



PHQ-9 Scale has been used to find out the level of depression. The possible range of scores in scale is 1-27, with the higher scores indicating the presence of major depressive disorder. In this study, the score 1-4 indicates Minimal depression, the score 5-9 indicates Mild depression, the score 10-14 indicates Moderate depression, the score 15-19 indicates Moderately severe participants, most of the participants 40% (n=20) had Mild depression, 16% (n=8) had Minimal depression 20% (n=10) had Moderate depression and the score 20-27 indicates Severe depression. This study shows that among the 50

depression, 22% (n=11) Moderately severe depression and 2% (n=1) had Severe depression.

Test assumption: Chi-square test

- Two categorical variable
- < 20% cell have expected count less than 5= Chi-square test
- >20% cell have expected count less than 5= Fisher's exact test

Association in between PHQ-9 & Socio-demographic information

Table-3: Association in between PHQ-9 & Socio-demographic variables

Socio-demographic variables	PHQ-9 Category	Pearson Chi-square (χ^2)/ Fisher's exact test	P- value
Age =<40years >40years	<ul style="list-style-type: none"> • (Minimal Depression • Mild depression • Moderate depression • Moderately severe depression • Severe depression) 	5.243	0.247
Sex		10.271	0.015*
Marital Status		7.184	0.098
Educational Status		12.342	0.818
Occupation		28.727	0.020*
Monthly Income		8.530	0.052
Residential Area		5.709	0.769
Traumatic Causes of Injury		51.676	0.416
Skeletal Level		36.708	0.000*
Neurological Level		39.935	0.000*
ASIA Classification Scale		48.551	0.000*
Types of Paralysis		45.084	0.000*

*Significant (P< 0.05)

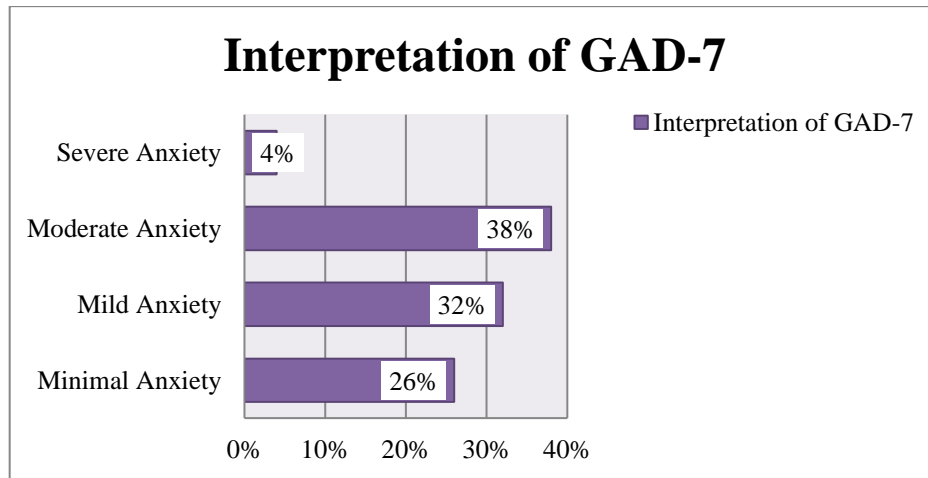
The study had association occurred between socio-demographic profile and PHQ-9 which was mentioned in the objective of the study. In this study, PHQ-9 scale was used by the

author. 9 statements had used to find out the level of depression. In the study, there was not a significant association in between category of PHQ-9 and age category. The Fisher exact value was 5.243 and P- value was 0.247 which was not significant. The The Fisher exact value was 10.271 and P- value was 0.015 in among in the association between gender and category of PHQ-9. So there was association between gender and category of PHQ-9 and was significant. There was also no association between marital status and category of PHQ-9. Here Fisher exact value was 7.184 and P-value was 0.098 and it was not significant. There was no association between educational level and the Category of PHQ-9. In this case Fisher exact value was 12.342 and P-value was 0.818 and it was not significant. There was a significant association between occupation and the category of PHQ-9. Here Fisher exact value was 28.727 and P-value was 0.020 ($P < 0.05$). There was a significant association between monthly income and the category of PHQ-9. In this case, Fisher exact value was 8.530 and P-value was 0.052. Residential area and the category of PHQ-9 had no association in between them. The Fisher exact value was 5.709 and P-value was 0.769. There was not a significant association in between causes of injury and the category of PHQ-9. The value of Fisher exact was 51.676 and P-value was 0.416. There was a strong significance in between skeletal level and the category of PHQ-9. Here Fisher exact value was 36.708 and P-value was 0.000 ($P < 0.05$). There was a significant association between neurological level and the category of PHQ-9. Here Fisher exact value was 39.935 and P-value was 0.000 ($P < 0.05$). The value of Fisher exact was 48.551 and P-value was 0.000 ($P < 0.05$) in between ASIA classification scale and the category of PHQ-9. So there was a significant association in between ASIA classification scale and the category of PHQ-9. The association in between types of paralysis and the category of PHQ-9 was highly significant. Here Fisher exact value was 45.084 and P-value was 0.000 ($P < 0.05$).

Table-4: Interpretation of GAD-7

Variable	Minimal Anxiety N (%)	Mild Anxiety N (%)	Moderate Anxiety N (%)	Severe Anxiety N (%)
Interpretation of GAD-7 Total score	13(26%)	16(32%)	19(38%)	2(4%)

Figure 14: Result of GAD-7 total score interpretation of all participants (n=50). The X-axis shows the anxiety percentage of participants.



GAD-7 Scale has been used to find out the level of anxiety. The possible range of scores in scale is 0-21, with the higher scores indicating the presence of severe anxiety disorder. In this study, the score 0-4 indicates Minimal anxiety, the score 5-9 indicates Mild anxiety, the score 10-14 indicates Moderate anxiety, the score 15-21 indicates severe anxiety. This study shows that among the 50 participants, most of the participants 38% (n=19) had Moderate anxiety, 32% (n=16) had Mild anxiety, 26% (n=13) had Minimal anxiety, 4% (n=2) severe anxiety.

Test assumption: Chi-square test

- Two categorical variable
- < 20% cell have expected count less than 5= Chi-square test
- >20% cell have expected count less than 5= Fisher’s exact test

Association in between GAD-7 & Socio-demographic information

Table-5: Association in between GAD-7 & Socio-demographic variables

Socio-demographic variables	GAD-7 Category	Pearson Chi-square (χ^2)/ Fisher’s exact test	P- value
Age= <40years >40years	<ul style="list-style-type: none"> • (Minimal Anxiety) • Mild Anxiety) • Moderate Anxiety) • Severe Anxiety) 	2.247	0.546
Sex		6.835	0.055*
Marital Status		1.325	0.757
Educational Level		9.707	0.658
Occupation		22.009	0.031*
Monthly Income		5.751	0.098
Residential Area		4.614	0.602
Traumatic Causes of Injury		19.131	0.123
Skeletal Level		25.667	0.000*
Neurological Level		29.022	0.000*
ASIA Classification Scale		41.469	0.000*
Types of Paralysis		36.554	0.000*

*Significant (P< 0.05)

The study had association between socio-demographic profile and GAD-7 which was mentioned in the objective of the study. In this study, GAD-7 scale was used by the author. 7 statements had used to find out the level of anxiety. In the study, there was not a

significant association in between category of GAD-7 and category of age. The Fisher exact value was 2.247 and P-value was 0.546 which was not significant. The Fisher exact value was 6.835 and P-value was 0.055 among the association between gender and the category of GAD-7. So there was significant relationship between gender and the category of GAD-7. There was also no association between marital status and the category of GAD-7. Here Fisher exact value was 1.325 and P-value was 0.757 and it was not significant. There was no association between educational level and the category of GAD-7. In this case Fisher exact value was 9.707 and P-value was 0.658 and it was not significant. There was a significant association between occupation and the category of GAD-7. Here Fisher exact value was 22.009 and P-value was 0.031 ($P < 0.05$). There was not a significant association between monthly income and the category of GAD-7. In this case, Fisher exact value was 5.751 and P-value was 0.098. Residential area and the category of GAD-7 had no association in between them. The Fisher exact value was 4.614 and P-value was 0.602. There was not a significant association in between causes of injury and the category of GAD-7. The Fisher exact value was 19.131 and P-value was 0.123. There was a strong significance in between skeletal level and the category of GAD-7. Here Fisher exact value was 25.667 and P-value was 0.000 ($P < 0.05$). There was a significant association between neurological level and the category of GAD-7. Here Fisher exact value was 29.022 and P-value was 0.000 ($P < 0.05$). The value of Fisher exact was 41.469 and P-value was 0.000 ($P < 0.05$) in between ASIA classification scale and the category of GAD-7. So there was a strong significant association in between ASIA classification scale and the category of GAD-7. The association in between types of paralysis and the category of GAD-7 was highly significant. Here Fisher exact value was 36.554 and P-value was 0.000 ($P < 0.05$).

One's life is drastically changed by spinal cord injury (SCI). SCI is associated with more severe mental health issues, which can lead to less favorable results like higher pain, challenges with health care, and drug use (Migliorini et al. 2008). One of the most well-known mental illnesses connected to SCI is depression. Depression is thought to be a SCI complication that impedes physical rehabilitation and hastens health issues (Williams and Murray, 2015). In this study, PHQ-9 scale and GAD-7 were used to measure the mental health (depression and anxiety).

A cross sectional study was used to find out the mental health status of individuals with spinal cord injury in rehabilitation stage. As this was a cross-sectional study, we consider this research as a preliminary study that can yield valuable information that may clarify many important questions related to spinal cord injury and their mental health. Among the 50 participants, male participants 78% (n=39) were higher than the female participants 22% (n=11). Most of the injured participants of this study were male following injury. Razzak (2013) reported that out of 56 participants, 84% were men and 16.0% were women. Arafat et al. (2018) discovered that among 150 participants, 90% were men and 10% were women after SCI. Therefore, it would appear that male individuals in spinal cord damage are more permeable than female participants.

In this study majority of the participant ages were less than 40 years. Similarly, Bombardier et al. (2008) discovered in their study that 29.7% of the population was between the ages of 25 and 35. Both findings suggest that young, active people (ages 20 to 40) are more susceptible to spinal cord injuries.

There were total 50 participants in this study, among them tetraplegia were 38% (n=19) and paraplegia were 62% (n=31). In their study of 364 people, Hammond et al. (2014) reported a similar sort of result: 56 paraplegia were 46.7% (n=170) and 53.3% (n=194) tetraplegia. There is a difference between the type of injury (paraplegia and tetraplegia), but anyone with spinal cord injury would be paraplegia or tetraplegia. In contrast to paraplegia, the degree of depression was found to be higher in tetraplegia, according to a

study by Arafat et al. (2018). Khazaeipour et al. (2015) discovered a significant prevalence of depression in tetraplegic patients (62.2%).

Among 50 participants, most of them were incomplete C were 42% (n=21) according to ASIA Scale; complete A were 24% (n=12), incomplete B were 20% (n=10), incomplete D were 14% (n=7). Siddall et al. (2017) reported a similar sort of outcome in their study, stating that 58.49% (n=31) of participants had complete spinal cord injury and 41.50% (n=22) of patients had incomplete spinal cord injury.

The study was carried out on 50 participants with Spinal Cord Injury. Among them, participants with fall from height were 40% (n=20), RTA were 30% (n=15), Fall during carrying heavy weight were 16% (n=8), Heavy weight fall on back were 6% (n=3), Sports injury were 2% (n=1), others were 6% (n=3) and Instead of falling from a height, motor vehicle accidents were the major cause of traumatic spinal cord injuries in North America (Mothe and Tator, 2013). But in the current study, vehicle traffic accidents and falls from heights were the two most frequent causes of injury. This can be because, similar to Bangladesh's neighbors like India, a higher proportion of people reside in Bangladesh's rural areas (Singh et al. 2003).

Among 50 participants, most of them were married 62% (n=31) and unmarried were 38% (n=19). Arafat et al. (2018) informed in his study that 64% were married and 32.67% were unmarried. In this study, participants live on rural area were 72% (n=36), participants live on semi urban area were 12% (n=6) and participants live on urban area were 16% (n=8). In their study, Arafat et al. (2018) reported that 64% of participants were married and 32.67% were single. Participants in this study made up 74.3% of urban participants and 25.7% of rural individuals.

In this study, among the participants illiterate were 20% (n=10), participants of primary school certified were 30% (n=15), participants of high school certified were 20% (n=10), participants of higher secondary were 22% (n=11) and participants who graduate or Post graduate were 8% (n=4). In another survey, the percentage of illiterates was 19.4%, primary students were 32.3%, SSC students were 25.8%, and HSC students were 22.6% (Imran et al. 2018).

Among the 50 participants, most of the participants (40%) had mild depression, 22% had moderately severe depression, 20% had moderate depression, 16% had minimal

depression and 2% had severe depression in rehabilitation stage after completion of a fitness sessions. Arafat et al. (2018) reported in their study that among 150 individuals, 30% had moderately severe depression, 28% had moderate depression, 25.33% had mild depression, 10.66% had minimum depression, and 6% had severe depression According to Fann et al. (2011), 37% of Australians who had spinal cord injuries also experienced mental health issues like depression. Another study found that probably minimal depression was 50% more common than mild depression, 27% more common than moderate depression, 14% more common than moderately severe depression, and 3% more common than severe depression (Migliorini et al. 2008).

Among the 50 participants, most of the participants (38%) had moderate anxiety, 32% had mild anxiety, 26% had minimal anxiety, 4% had severe anxiety in rehabilitation stage after the completion of a fitness sessions. Wood et al. (2021) reported that music therapy and supportive rehabilitation unit can lower the anxiety levels of SCI population.

Spinal cord injury (SCI) is a severe, permanently debilitating condition. The most common co-morbidity among the numerous psychological conditions linked to SCI is depression. Bangladesh is a heavily populated developing country with a significant SCI prevalence. Previous studies have demonstrated that depression symptoms, whether mild or severe, are poorly managed and ignored. But for a complete recovery, it's crucial to comprehend the long-term physical and psychological implications of SCI.

This study found an association in between types of paralysis and depression ($P < 0.000$) which was strongly significant. The fact that mildly depressed paraplegics and tetraplegics were less active than non-depressed paraplegics and tetraplegics, as reported by Saadat et al. (2010), implies that there may be a connection between depression and the kind of injury. According to Arafat et al. (2018), 73 tetraplegics had patients with moderately severe depression ($n=30$), and 77 participants were paraplegic, with the majority of them having mild depression ($n=30$). The severity of the injury was correlated with the intensity of the depression.

This study also found a significant association in between skeletal level and depression, also found significant association in between neurological level and depression. There also found association in between occupation and depression.

This study also found a strong significant association in between types of paralysis and anxiety ($P < 0.000$). There also found association of skeletal level, neurological level and occupation with anxiety.

In this study there was no association of depression and anxiety severity with the causes for the injury or statistically significant relevance. Similar to this, Arango-Lasprilla et al. (2013) discovered that there was no connection between depression and the source of the injury in their investigation. A study conducted at CRP showed that spinal cord injured patient being satisfied by taking or participating in a balance group and improved their quality of life and increased community re-integration.

5.1 Limitations

The accuracy of the study was impacted by a number of restrictions and obstacles in this research effort, including the following: The study's findings could not be generalized to the entire Bangladeshi population who suffer from spinal cord injuries because just a small number of samples were collected from the CRP in Savar. In the context of Bangladesh, there was little evidence to back up the project's outcome. The study employed a convenience sample that did not represent the whole population. An undergraduate student completed the research assignment, which was her first. As a result, in terms of the practical components of research, the researcher had little experience with procedures and tactics. Because this was the researcher's first survey, it might be possible that the supervisor and respectable teachers overlooked a few mistakes.

6.1 Conclusion

A spinal cord injury (SCI) is a sudden, unpredictably occurring condition that may happen acutely or continuously and has a long-term effect on both physical and mental function. It is the main contributor to disability both in Asia and Bangladesh. Spinal cord injuries, whether it is traumatic or not, have an effect on thousands of people every year. Despite the fact that active young men are more prone than women to experience the disorder, spinal cord injury can affect anyone, at any age, at any time.

Patients who have suffered spinal cord injuries must accept their limitations. Their quality of life is negatively impacted by their anxiety, unhappiness, and resulting lack of confidence. Since anxiety and depression are two of the deadly mental disorders that are most frequently diagnosed, they should be given more importance. Improvements were observed in people with all degrees of impairment, while paraplegic and incomplete spinal cord injury patients made the biggest strides. It is impossible to overstate the significance of early diagnosis and meticulous management of this illness.

According to the study a significant portion of SCI patients were found to be mildly depressed because of including in a fitness sessions. And the level of depression is much less among paraplegic patients. But the level of anxiety is moderate among most of the patients after completing a fitness sessions. Unexpectedly, a significant portion of patients in a country like Bangladesh go undiagnosed, untreated, or with inadequate care. According to our knowledge, very little research has been done especially on the symptoms and determinants of depression and anxiety in people with SCI. Health planners and social service providers must have a good awareness of the psychological challenges that SCI sufferers encounter, as well as the variations that result from the cultural, physical, and environmental circumstances, including the resources available in each community. Additional extensive research is required to accurately represent the burden.

More study is required to ascertain the potential causes of the low rates of depression treatment among SCI patients. Evidence from numerous medical contexts shows that professional education and feedback are insufficient to significantly improve depression care, with the most successful programs incorporating thorough patient education, diligent follow-up, and expanded access to evidence-based therapies. Designing and evaluating comparable approaches is required to improve depression care for people with SCI.

6.2 Recommendation

The aim of the study was to find out mental health effect of people with spinal cord injury after the completion of fitness sessions. Even though the study had several limitations, the researcher suggested a few additional steps that could be implemented to improve the success of future research.

The random sampling technique rather than the convenience sampling technique would be chosen in further in order to enabling the power of generalization the results. There are so many studies based on spinal cord injury but there are few amount of studies related to the concept of this patient's mental health such as depression.

The investigation was conducted for relatively short period of time; thus, in the future, more time should be allocated to the study. The sample size for this study was 50 people, however the sample size will be increased in the future.

In this study, the investigator took the participants only from the one selected hospital of Savar as a sample for the study. So for further study investigator strongly recommended to include the SCI patients from all over the Bangladesh to ensure the generalize ability of this study

REFERENCES

Aaby, A, Ravn, SL, Kasch, H & Andersen, TE 2020, 'The associations of acceptance with quality of life and mental health following spinal cord injury: a systematic review', *Spinal cord*, vol. 58, no. 2, pp. 130-148.

Ahuja, CS, Wilson, JR, Nori, S, Kotter, MR, Druschel, C, Curt, A, & Fehlings, MG 2017, 'Traumatic spinal cord injury', *Nature Reviews Disease primers*, vol. 3, no. 1, pp. 1-21.

Amiri, S & Behnezhad, S 2019, 'Obesity and anxiety symptoms: a systematic review and meta-analysis', *Neuropsychiatrie: Klinik, Diagnostik, Therapie und Rehabilitation: Organ der Gesellschaft Österreichischer Nervenärzte und Psychiater*, vol. 33, no. 2, pp. 72-89.

Andresen, SR, Biering-Sørensen, F, Hagen, EM, Nielsen, JF, Bach, FW & Finnerup, NB 2016, 'Pain, spasticity and quality of life in individuals with traumatic spinal cord injury in Denmark', *Spinal cord*, vol. 54, no. 11, pp. 973-979.

Arango-Lasprilla, JC, Ketchum, JM, Starkweather, A, Nicholls, E, & Wilk, AR 2011, 'Factors predicting depression among persons with spinal cord injury 1 to 5 years post injury' *Neuro Rehabilitation*, vol. 29, no. 1, pp. 9-21.

Arafat, S, Ahmed, S, Ahmed, F, Zaman, S, & Andalib, A 2018, 'Depression in spinal cord injury patients: a cross-sectional observation with phq-9 in a rehabilitation center of Bangladesh' *J Behav Health*, vol. 7, pp. 36-40.

Bican, O, Minagar, A & Pruitt, AA 2013, 'The spinal cord: a review of functional neuroanatomy', *Neurologic clinics*, vol. 31, no. 1, pp. 1-18.

Bombardier, CH, Richards, JS, Krause, JS, Tulskey, D & Tate, DG 2004, 'Symptoms of major depression in people with spinal cord injury: implications for screening' *Archives of physical medicine and rehabilitation*, vol. 85, no. 11, pp. 1749-1756.

Bombardier, CH, Fann, JR, Tate, DG, Richards, JS, Wilson, CS, Warren, AM, & PRISMS Investigators 2012, 'An exploration of modifiable risk factors for depression

after spinal cord injury: which factors should we target?', *Archives of physical medicine and rehabilitation*, vol. 93, no. 5, pp. 775-781.

Budh CN & Osteråker AL 2007, 'Life satisfaction in individuals with a spinal cord injury and pain', *Clinical Rehabilitation*, vol. 21, no.1, pp. 89-96.

Craig, A, Tran, Y & Middleton, J 2017, 'Theory of adjustment following severe neurological injury: evidence supporting the spinal cord injury adjustment model' *Horizons in neuroscience research*, vol. 29, pp 117-39.

Cripps, RA, Lee, BB, Wing, P, Weerts, E, Mackay, J & Brown, D 2011, 'A global map for traumatic spinal cord injury epidemiology: towards a living data repository for injury prevention', *Spinal cord*, vol. 49, no. 4, pp. 493-501.

Fann, JR, Bombardier, CH, Richards, JS, Tate, DG, Wilson, CS, Temkin, N & PRISMS Investigators 2011, 'Depression after spinal cord injury: comorbidities, mental health service use, and adequacy of treatment' *Archives of Physical medicine and Rehabilitation*, vol. 92, no. 3, pp. 352-360.

Fann, JR, Crane, DA, Graves, DE, Kalpakjian, CZ, Tate, DG & Bombardier, CH 2013, 'Depression treatment preferences after acute traumatic spinal cord injury', *Archives of physical medicine and rehabilitation*, vol. 94, no. 12, pp. 2389-2395.

Fehlings, MG, Tetreault, LA, Wilson, JR, Kwon, BK, Burns, AS, Martin, AR, Hawryluk, G & Harrop, JS 2017, 'A clinical practice guideline for the management of acute spinal cord injury: introduction, rationale, and scope', *Global spine journal*, vol. 7, no. 3, pp. 84S-94S.

Fehlings, MG, Moghaddamjou, A, Harrop, JS, Stanford, R, Ball, J, Aarabi, B, Freeman, BJ, Arnold, PM, Guest, JD, Kurpad, SN & Schuster, JM 2023, 'Safety and Efficacy of Riluzole in Acute Spinal Cord Injury Study (RISCIS): A Multi-Center, Randomized, Placebo-Controlled, Double-Blinded Trial', *The spine journal*, vol. 23, no. 9, pp. S36.

Geard, A, Kirkevold, M, Løvstad, M & Schanke, AK 2018, 'Exploring narratives of resilience among seven males living with spinal cord injury: A qualitative study', *BMC psychology*, vol. 6, no. 1, pp. 1-10.

Guest, R, Perry, KN, Tran, Y, Middleton, J & Craig, A 2014, 'A prospective study of the change in quality of life in adults with a newly acquired spinal cord injury', *Int J Phys Med Rehabil*, vol. 2, no. 222, pp. 2.

Guilcher, SJ, Parsons, D, Craven, BC, Jaglal, SB & Verrier, M 2015, 'Developing quality of care indicators for patients with traumatic and non-traumatic spinal cord injury (SCI): A feasibility study using administrative health data', *The Journal of Spinal Cord Medicine*, vol. 38, no. 6, pp. 765-776.

Hachem, LD, Ahuja, CS & Fehlings, MG 2017, 'Assessment and management of acute spinal cord injury: From point of injury to rehabilitation', *The journal of spinal cord medicine*, vol. 40, no. 6, pp. 665-675.

Hagen, EM, Rekand, T, Gilhus, NE & Grønning, M 2012, 'Traumatic spinal cord injuries—incidence, mechanisms and course', *Tidsskrift for Den norske legeforening*.

Hearn, JH & Finlay, KA 2018, 'Internet-delivered mindfulness for people with depression and chronic pain following spinal cord injury: a randomized, controlled feasibility trial', *Spinal Cord*, vol. 56, no. 8, pp. 750-761.

Hoque, MF, Hasan, Z, Razzak, ATMA & Helal, SU 2012, 'Cervical spinal cord injury due to fall while carrying heavy load on head: a problem in Bangladesh', *Spinal Cord*, vol. 50, no. 4, pp. 275-277.

Hossain, M 2016, *Level of depression of spinal cord injury patients before and after participating sports at crp: a comparison study (Doctoral dissertation, Bangladesh Health Professions Institute, Faculty of Medicine, the University of Dhaka, Bangladesh)*.

Huang, H, Young, W, Skaper, S, Chen, L, Moviglia, G, Saberi, H, Al-Zoubi, Z, Sharma, HS, Muresanu, D, Sharma, A & El Masry, W 2020, 'Clinical neurorestorative therapeutic

guidelines for spinal cord injury (IANR/CANR version 2019)', *Journal of orthopaedic translation*, vol. 20, pp. 14-24.

Kang, Y, Ding, H, Zhou, H, Wei, Z, Liu, L, Pan, D & Feng, S 2018, 'Epidemiology of worldwide spinal cord injury: a literature review', *Journal of Neurorestoratology*, vol. 6, no.1, pp. 3.

Khazaeipour, Z, Taheri-Otaghsara, SM & Naghdi, M 2015, 'Depression following spinal cord injury: its relationship to demographic and socioeconomic indicators', *Topics in spinal cord injury rehabilitation*, vol. 21, no. 2, pp. 149-155.

Kumar, N & Gupta, B 2016, 'Effect of spinal cord injury on quality of life of affected soldiers in India: a cross-sectional study', *Asian spine journal*, vol. 10, no. 2, pp. 267.

Lee, BB, Cripps, RA, Fitzharris, M & Wing, PC 2014, 'The global map for traumatic spinal cord injury epidemiology: update 2011, global incidence rate', *Spinal cord*, vol. 52, no. 2, pp. 110-116.

Lim, SW, Shiue, YL, Ho, CH, Yu, SC, Kao, PH, Wang, JJ & Kuo, JR 2017, 'Anxiety and depression in patients with traumatic spinal cord injury: a nationwide population-based cohort study' *PLoS One*, vol. 12, no. 1, pp. e0169623.

Mathur, N, Jain, S, Kumar, N, Srivastava, A, Purohit, N & Patni, A 2015, 'Spinal cord injury: scenario in an Indian state', *Spinal Cord*, vol. 53, no. 5, pp. 349-352.

Mehta, S, Orenczuk, S, Blackport, D & Teasell, R 2020, *Mental Health after a Spinal Cord Injury*. Scire Project.

Miyakoshi, N, Suda, K, Kudo, D, Sakai, H, Nakagawa, Y, Mikami, Y, Suzuki, S, Tokioka, T., Tokuhira, A, Takei, H & Katoh, S 2021, 'A nationwide survey on the incidence and characteristics of traumatic spinal cord injury in Japan in 2018' *Spinal Cord*, vol. 59, no. 6, pp. 626-634.

Nas, K, Yazmalar, L, Şah, V, Aydın, A & Oneş, K 2015, 'Rehabilitation of spinal cord injuries', *World journal of orthopedics*, vol.6 , no. 1, pp. 8.

New, PW, Cripps, RA & Lee, BB 2014, 'Global maps of non-traumatic spinal cord injury epidemiology: towards a living data repository', *Spinal cord*, vol. 52, no. 2, pp. 97-109.

New, PW, Farry, A, Baxter, D & Noonan, VK 2013, 'Prevalence of nontraumatic spinal cord injury in Victoria, Australia', *Spinal Cord*, vol. 51, no. 2, pp. 99–102.

Noonan, VK, Fingas, M, Farry, A, Baxter, D, Singh, A, Fehlings, MG & Dvorak, MF 2013, 'Incidence and prevalence of spinal cord injury in Canada: a national perspective', *Neuroepidemiology*, vol. 38, no. 4, pp. 219-226.

Post, MW & van Leeuwen, CM 2012, 'Psychosocial issues in spinal cord injury: A review', *Spinal Cord*, vol. 50, no. 5, pp. 382–89.

Quadri, SA, Farooqui, M, Ikram, A, Zafar, A, Khan, MA, Suriya, SS, Claus, CF, Fiani, B, Rahman, M, Ramachandran, A & Armstrong, II 2020, 'Recent update on basic mechanisms of spinal cord injury', *Neurosurgical Review*, vol. 43, pp. 425-441.

Rahnama, P, Javidan, AN, Saberi, H, Montazeri, A, Tavakkoli, S, Pakpour, AH & Hajiaghababaei, M 2015, 'Does religious coping and spirituality have a moderating role on depression and anxiety in patients with spinal cord injury? A study from Iran', *Spinal Cord*, vol. 53, no. 12, pp. 870-874.

Razzak, ATMA, Helal, SU & Nuri, RP 2011, 'Life expectancy of persons with spinal cord injury (SCI) treated in a rehabilitation center at Dhaka, Bangladesh', *Disability, CBR and Inclusive Development Journal*, vol. 22, no. 1, pp. 114-123.

Razzak, ATMA 2013, 'Early care following traumatic spinal cord injury (TSCI) in a rehabilitation centre in Bangladesh-an analysis', *Disability, CBR & Inclusive Development*, vol. 24, no. 2, pp. 64-78.

Razzak, ATMA, Roy, R & Khan, S 2016, 'Demographic profile of spinal cord injury (SCI): a hospital-based prospective study in Bangladesh', *Disability, CBR & Inclusive Development*, vol. 27, no. 4, pp. 138-155.

Robert, AA & Zamzami, MM 2013, 'Traumatic spinal cord injury in Saudi Arabia: a review of the literature', *The Pan African medical journal*, vol. 16.

Rodrigues, JA, Pereira, ET, de Oliveira, CEP & Moreira, OC 2020, 'Effect of strength training on physical and mental health and quality of life of people with spinal cord injury: a literature review', *Arch. Med. Deport*, vol. 37, pp. 192-196.

Saunders, LL, Krause JS & Focht KL 2012, 'A longitudinal study of depression in survivors of spinal cord injury', *Spinal Cord*, vol. 50, no. 1, pp. 72-77.

Schultz, KR, Mona, LR & Cameron, RP 2022, 'Mental Health and Spinal Cord Injury: Clinical Considerations for Rehabilitation Providers' *Current Physical Medicine and Rehabilitation Reports*, vol. 10, no. 3, pp. 131-139.

Schonenberg, M, Reimitz, M, Jusyte, A, Maier, D, Badke, A & Hautzinger, M 2014, 'Depression, posttraumatic stress, and risk factors following spinal cord injury', *International journal of behavioral medicine*, vol. 21, pp. 169-176.

Scholten, EW, Tromp, ME, Hillebregt, CF, De Groot, S, Ketelaar, M, Visser-Meily, JM & Post, M.W 2018, 'Mental health and life satisfaction of individuals with spinal cord injury and their partners 5 years after discharge from first inpatient rehabilitation', *Spinal Cord*, vol. 56, no. 6, pp. 598-606.

Sezer, N, Akkuş, S & Ugurlu, FG 2015, 'Chronic complications of spinal cord injury', *World journal of orthopedics*, vol. 6, no. 1, p. 24.

Shin, JC, Goo, HR, Yu, SJ, Kim, DH & Yoon, SY 2012, 'Depression and quality of life in patients within the first 6 months after the spinal cord injury', *Annals of rehabilitation medicine*, vol. 36, no. 1, pp. 119-125.

Stanford, RE, Soden, R, Bartrop, R, Mikk, M & Taylor, TKF 2007, 'Spinal cord and related injuries after attempted suicide: psychiatric diagnosis and long-term followup', *Spinal Cord*, vol. 45, no. 6, pp. 437-443.

Sweis, R & Biller, J 2017, 'Systemic complications of spinal cord injury', *Current neurology and neuroscience reports*, vol. 17, pp. 1-8.

Tweedy, SM, Beckman, EM, Geraghty, TJ, Theisen, D, Perret, C, Harvey, LA & Vanlandewijck, YC 2017, 'Exercise and sports science Australia (ESSA) position

statement on exercise and spinal cord injury’, *Journal of Science and Medicine in Sport*, vol. 20, no. 2, pp. 108-115.

Uprose, M 2017, Satisfaction of spinal cord injury patients to balance group therapy in a specialized rehabilitation centre in Bangladesh.

Wan, FJ, Chien, WC, Chung, CH, Yang, YJ & Tzeng, NS 2020, ‘Association between traumatic spinal cord injury and affective and other psychiatric disorders—A nationwide cohort study and effects of rehabilitation therapies’, *Journal of affective disorders*, vol. 265, pp. 381-388.

Weller, CM & Baker, FA 2011, ‘The role of music therapy in physical rehabilitation: a systematic literature review’, *Nordic Journal of Music Therapy*, vol. 20, no. 1, pp. 43-61.

Williams, R & Murray, A 2015, ‘Prevalence of depression after spinal cord injury: a meta-analysis’, *Archives of physical medicine and rehabilitation*, vol. 96, no. 1, pp. 133-140.

Williams, TL, Smith, B & Papatomas, A 2015, ‘Promoting physical activity for people with spinal cord injury: What role do physiotherapists play?’ *International Journal of Therapy & Rehabilitation*, vol. 22.

Williams, TL, Smith, B & Papatomas, A 2018, ‘Physical activity promotion for people with spinal cord injury: physiotherapists’ beliefs and actions’, *Disability and rehabilitation*, vol. 40, no. 1, pp. 52-61.

Witiw, CD & Fehlings, MG 2015, ‘Acute Spinal Cord Injur’, *Journal of Spinal Disorders and Techniques*, vol. 28, no. 6, pp. 202–210.

Wood, C, Cutshall, SM, Lawson, DK, Ochtrup, HM, Henning, NB, Larsen, BE, Bauer, BA, Mahapatra, S & Wahner-Roedler, DL 2021, ‘Music therapy for anxiety and pain after spinal cord injury: a pilot study’, *Global Advances in Health and Medicine*, vol. 10, pp. 21649561211058697.

Yamazaki, K, Kawabori, M, Seki, T & Houkin, K 2020, 'Clinical trials of stem cell treatment for spinal cord injury', *International Journal of Molecular Sciences*, vol. 21, no. 11, pp. 3994.

Y, Ding, H, Zhou, H, Wei, Z, Liu, L, Pan, D & Feng, S 2018, 'Epidemiology of worldwide spinal cord injury: a literature review', *Journal of Neurorestoratology*, vol. 6, no. 1, pp. 3.

অনুমতি পত্র

(অংশগ্রহণকারীকে পড়ার জন্য অনুরোধ করা হলো)

আসসালামু আলাইকুম

আমি তানজিলা ইসলাম শূচী, ঢাকা বিশ্ববিদ্যালয় এর চিকিৎসা অনুষদের অন্তর্ভুক্ত বাংলাদেশ হেলথ প্রফেশনাল ইন্সটিটিউট এর বিএসসি ইন ফিজিওথেরাপি কোর্সের ২০১৭-২০১৮ সেশনের শিক্ষার্থী। বিএসসি ইন ফিজিওথেরাপি ডিগ্রী অর্জনের জন্য আমাকে একটি গবেষণা সম্পূর্ণ করতে হবে। আমার গবেষণার শিরোনাম হল “ ফিটনেস সেশনের সমাপ্তির পরে মেরুদন্ডের আঘাতে আক্রান্ত ব্যক্তিদের মানসিক স্বাস্থ্যের প্রভাব”। এই গবেষণা সম্পূর্ণ করার জন্য আমি আপনাকে আপনার ব্যক্তিগত ও মানসিক অবস্থা সম্পর্কিত কিছু প্রশ্ন করব। এতে আনুমানিক ৩০ থেকে ৪০ মিনিট সময় লাগবে। আমি আপনাকে অনুগত করছি যে, এটা আমার অধ্যয়নের একটি অংশ যা অন্য কোন উদ্দেশ্যে ব্যবহৃত হবে না। তাই এই গবেষণায় অংশগ্রহণ আপনার বর্তমান ও ভবিষ্যতের চিকিৎসায় কোন প্রভাব ফেলবে না। আপনি যে তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে। এই গবেষণায় আপনার অংশগ্রহণ স্বেচ্ছায় এবং কোন নেতিবাচক প্রভাব ছাড়াই আপনি যে কোন সময় এই অধ্যয়ন থেকে নিজেকে প্রত্যাহার করে নিতে পারবেন। এছাড়াও কোন প্রশ্ন আপনার পছন্দ না হলে উত্তর না দেওয়ার বা সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকার আপনার আছে। এই অধ্যয়নে অংশগ্রহণকারী হিসেবে আপনার কোন প্রশ্ন থাকলে আপনি আমার সাথে অথবা আমার সুপারভাইজার মোঃ শফিকুল ইসলাম, বিএইচপিআই এর প্রভাষক, বিভাগীয় প্রধান ফিজিওথেরাপি ডিপার্টমেন্ট, বিএইচপিআই. সি আর পি সাভার, ঢাকা এর সাথে যোগাযোগ করতে পারেন।

আপনি যদি অনুগ্রহপূর্বক আপনার সম্মতি দেন, তবে আমরা শুরু করতে পারি।

হ্যাঁ

না

ধন্যবাদ আপনার অংশগ্রহণের পাশপাশি প্রশ্নগুলোর যথাযথ উত্তর দিয়ে সহযোগিতা করার জন্য।

অংশগ্রহণকারীর স্বাক্ষর

তারিখ

তথ্য সংগ্রহকারীর স্বাক্ষর

তারিখ

গবেষকের স্বাক্ষর

তারিখ

Appendix

VERBAL CONSENT STATEMENT

(Please read out to the participants)

Assalamualaikum/Namasker, My name is Tanjila Islam Shuchi , I am conducting this study for a B.Sc in Physiotherapy project study dissertation titled “**Mental Health Effect of People with SCI After Completion of a Fitness Sessions**” under Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information regarding Spinal Cord Injury (SCI). You will perform some tasks which are mention in this form. This will take approximately 30-40 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. The researcher is not directly related with this area (spinal cord injury), so your participation in the research will have no impact on your present or future treatment in this area (spinal cord injury unit). All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous and also all information will be destroyed after completion of the study. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me, researcher and/or my supervisor **Md. Shofiqul Islam**, Associate Professor& Head, dept. of Physiotherapy, BHPI, CRP, Savar, Dhaka.

Do you have any questions before I start?

So, may I have your consent to proceed with the interview or work?

Yes

No

Signature of the Participant _____

Signature of the Interviewer _____

প্রশ্নাবলী (বাংলা)

	স্বাক্ষাৎকারের সময়সূচী পর্ব-১ঃ রোগীর সনাক্তকরণ/পরিচয় (রোগী অথবা রোগীর সহকারী তথ্য প্রদান করবেন)	
১.১	রোগীর আইডিঃ	স্বাক্ষাৎকারের তারিখঃ
১.২	ঠিকানাঃ	যোগাযোগ নম্বরঃ
১.৩	অনুমতি নেওয়া হয়েছেঃ	হ্যাঁ না

	পর্ব-২ঃ রোগীর আর্থসামাজিক তথ্যাবলি (রোগী অথবা রোগীর সহকারী তথ্য প্রদান করবেন)	
২.১	আপনার বয়স বছর	
২.২	লিঙ্গঃ	১. মহিলা ২. পুরুষ
২.৩	বৈবাহিক অবস্থা	১. বিবাহিত ২. অবিবাহিত ৩. বিধাব/বিপত্নীক ৪. বিবাহ বিচ্ছিন্ন
২.৪	শিক্ষাগত যোগ্যতাঃ	১. কোনো প্রাতিষ্ঠানিক শিক্ষা নেই ২. প্রাথমিক শিক্ষা ৩. মাধ্যমিক শিক্ষা ৪. উচ্চমাধ্যমিক শিক্ষা ৫. স্নাতক/স্নাতকোত্তর ৬. অন্যান্য
২.৫	পেশাঃ	১. রিক্সাচালক ২. কৃষিকাজ ৩. ফ্যাক্টরি/পোশাক শ্রমিক ৪. গাড়ি চালক ৫. ব্যবসায়ী ৬. দিন মজুর ৭. বেকার ৮. গৃহিণী ৯. শিক্ষক ১০. ছাত্র/ছাত্রী
২.৬	পারিবারিক মাসিক আয় টাকা
২.৭	বসবাসের স্থান	১. গ্রাম ২. উপ-শহর ৩. শহর

পর্ব-৩ঃ ফিজিওথেরাপি সম্পর্কিত তথ্যাবলি (রোগী দলিল/ রোগীর সহকারী/ পরিষ্কার মাধ্যমে নিতে হবে)		
৩.১	আঘাতের তারিখঃ	
৩.২	আঘাতের কারণঃ	<ol style="list-style-type: none"> ১. মোটর যানের আঘাতে ২. উপর থেকে পড়ে যাওয়া ৩. ভারী কিছু বহন করার সময় পড়ে গিয়ে ৪. খেলাধুলার কারণে ৫. পিঠে ভারী কিছু পড়ে ৬. বন্দুকের গুলির আঘাত ৭. ছরিকাঘাত ৮. অন্যান্য
৩.৩	আঘাত জনিত কারণ নয়ঃ	<ol style="list-style-type: none"> ১. মেরুদণ্ডে টিবি ২. টিউমার ৩. জন্মগত ত্রুটি ৪. মাল্টিপল স্ক্লেরোসিস ৫. সংক্রমন ৬. অন্যান্য
৩.৪	স্কেলেটাল লেভেলঃ	
৩.৫	নিউরোলজিকাল লেভেলঃ	
৩.৬	এশিয়া স্কেল লেভেলঃ	<ol style="list-style-type: none"> ১. কমপ্লিট এ ২. ইনকমপ্লিট বি ৩. ইনকমপ্লিট সি ৪. ইনকমপ্লিট ডি ৫. নরমাল ই
৩.৭	শারিরিক অসারতার কারণ	<ol style="list-style-type: none"> ১. টেট্রাপ্লেজিক ২. পেরাপ্লেজিক

পর্ব-৪ঃ পি এইচ কিউ ৯ স্কেল
রোগীর স্বাস্থ্য সম্পর্কিত প্রশ্নাবলী (পিএইচকিউ ৯)

রোগীর আইডিঃ

তারিখঃ

গত দুই সপ্তাহের মধ্যে নিচের উল্লিখিত সমস্যার জন্য আপনি কতবার বিরক্ত হয়েছেন?

(√ চিহ্ন ব্যবহার করে আপনার উত্তর দিন)

	একবারই না	কিছু দিন	অর্ধেকের বেশি দিন	প্রায় প্রতিদিন
১. আমি কাজ করতে খুব কমই আগ্রহ বা আনন্দ পেয়েছি।	০	১	২	৩
২. আমি ভেঙ্গে পড়েছি, বিষাদগ্রস্ত এবং আশাহত হয়েছি।	০	১	২	৩
৩. আমার ঘুমাতে সমস্যা হয়েছে অথবা অনেক বেশি ঘুম হয়েছে।	০	১	২	৩
৪. আমি ক্লান্ত বোধ করেছি অথবা একদম শক্তি পাইনি।	০	১	২	৩
৫. আমার কম ক্ষুদা লেগেছে অথবা অনেক বেশি খেয়েছি।	০	১	২	৩
৬. আমি নিজেকে নিয়ে দুঃচিন্তায় আছি, অথবা আমি ব্যর্থ অথবা আমি নিজেকে না হয় আমার পরিবারকে নিচু করে ফেলেছি।	০	১	২	৩
৭. কোন কিছুতে মনোযোগ ধরে রাখতে সমস্যা হয় যেমন: খবরের কাগজ পড়তে অথবা টেলিভিশন দেখতে।	০	১	২	৩
৮. আমি এত আশ্বে চলাচল করি অথবা কথা বলি যে অন্যরা খেয়ালই করে না অথবা এর উল্টোটা- স্বাভাবিকের চেয়ে বিরামহীন ভাবে অনেক বেশি নড়াচড়া করি।	০	১	২	৩
৯. আমার মনে হয় মরে গেলেই ভাল হয় অথবা নিজেই নিজেকে আঘাত করি	০	১	২	৩

সর্বমোট =

সর্বমোট নাম্বারের ব্যাখ্যাঃ

সর্বমোট নাম্বারের	হতাশার পরিমাণ
১ - ৪	খুবই অল্প হতাশা
৫ - ৯	অল্প হতাশা
১০ - ১৪	মাঝারি হতাশা
১৫ - ১৯	মাঝারির চেয়ে বেশি হতাশা
২০ - ২৭	খুব বেশি হতাশা

পর্ব-৫ঃ জিএডি-৭ দ্বারা উদ্বেগ পরিমাপ করা হয়

গত দুই সপ্তাহের মধ্যে নিচের উল্লিখিত সমস্যার জন্য আপনি কতবার বিরক্ত হয়েছেন?

(√ চিহ্ন ব্যবহার করে আপনার উত্তর দিন)

	মোটও নিশ্চিত নয়	বেশ কিছু দিন	অর্ধেক দিন ধরে	প্রায় প্রতিদিন
১. বিচলিত, উদ্ভিন্ন বা প্রান্তে অনুভব করা	০	১	২	৩
২. উদ্বেগ থামাতে বা নিয়ন্ত্রন করতে সক্ষম না হওয়া	০	১	২	৩
৩. বিভিন্ন জিনিস নিয়ে খুব বেশি চিন্তিত	০	১	২	৩
৪. আরাম নিতে সমস্যা	০	১	২	৩
৫. এত অস্থির হওয়া যে চুপ করে বসে থাকা কঠিন	০	১	২	৩
৬. সহজে বিরক্ত বা খিটখিটে হয়ে উঠা	০	১	২	৩
৭. ভয় লাগছে যেন ভয়ঙ্কর কিছু ঘটতে পারে	০	১	২	৩
প্রতিটি কলামের স্কোর যোগ করুন =		+	+	+
মোট স্কোর (আপনার কলামের স্কোর যোগ করুন) =				

English questionnaire

Interview Schedule		
Part- I: Patient's Identification		
(to be provided by patient or attendant)		
1.1	Patient ID :	Date of Interview:
1.2	Address:	Contact no:

Part- II: Patient's Socio-demographic Information(To be collected from Record/Patient/Care giver)		
2.1	Age (In year):..... Yrs	
2.2	Sex	1. Female 2. Male
2.3	Marital status:	1. Married 2. Unmarried 3. Widow/Widower 4. Divorced
2.4	Educational level?	1. Illiterate 2. Primary School Certificate 3. High School Certificate 4. Higher Secondary Certificate 5. Graduation/Post Graduation 6. Others
2.5	Occupation?	1. Rickshaw Puller 2. Farmer 3. Factory/Garments Worker 4. Driver 5. Business 6. Day Labourer 7. Jobless

		8. House Wife 9. Teacher 10. Students
2.6	What is the average monthly income of your household?	_____ (<i>Taka</i>)
2.7	Residential Area	1. Rural 2. Semi-Urban 3. Urban

Part-III: Physiotherapy related Information (To be collected from Record/ Care provider/Clinical examination)		
3.1	Date of injury:	
3.2	Traumatic Causes of injury:	<ol style="list-style-type: none"> 1. Road Traffic Accident 2. Fall From High 3. Fall Carrying Heavy Weight 4. Sports Injury 5. Heavy Weight Fall On Back 6. Gun Shot 7. Knife Injury 8. Others
3.3	Non-Traumatic Causes of injury:	<ol style="list-style-type: none"> 1. Spinal Tuberculosis 2. Tumor 3. Birth Defect 4. Multiple Sclerosis 5. Infections 6. Others
3.4	Skeletal Level :	
3.5	Neurological Level :	
3.6	ASIA Classification Scale :	<ol style="list-style-type: none"> 1. Complete A 2. Incomplete B 3. Incomplete C 4. Incomplete D 5. Normal E
3.7	Types of paralysis:	<ol style="list-style-type: none"> 1. Tetraplegic 2. Paraplegic

PATIENT HEALTH QUESTIONNAIRE (PHQ09)

PATIENT ID :..... **DATE**:

Over the last 2 weeks, how often have you been bothered by any of the following problems?

(use “√” to indicate your answer)

	Not at all	Several days	More than half days	Nearly Every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling or staying asleep or sleeping too much.	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself.	0	1	2	3

TOTAL=

Interpretation of total score:

Total Score	Depression Severity
1 – 4	Minimal depression
5 – 9	Mid depression
10 – 14	Moderate depression
15 – 19	Moderately severe depression
20 – 27	Severe depression

GAD-7 Anxiety

Over the last 2 weeks, how often have you been bothered by any of the following problems?
(use “√” to indicate your answer)

	Not at all	Several days	More than half days	Nearly Every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Column Totals + + +
Total Score

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2 and 3 to the response categories, respectively, of “not at all”, “several days”, “more than half the days”, and “nearly every day.”

GAD-7 total score for the seven items ranges from 0 to 21

- 0 – 4 : Minimal anxiety
- 5 – 9 : Mid anxiety
- 10 – 14 : Moderate anxiety
- 15 – 21: Severe anxiety

Permission letter

Date: 18th February 2023
The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI), CRP
Savar, Dhaka-1343. Bangladesh

Subject: Application for review and ethical approval.

Dear sir,

With due respect, I am Tanjila Islam Shuchi, student of B.Sc. in physiotherapy program at Bangladesh Health Professions Institute (BHPI) the academic institute of Centre for the Rehabilitation of the Paralyzed (CRP) under the Faculty of Medicine, University of Dhaka. As per the course curriculum, I have to conduct a dissertation entitled "**Mental health effect of people with spinal cord injury after the completion of fitness session**" under the supervision of Md. Shofiqul Islam, Head of the Department, Department of Physiotherapy, BHPI.

The purpose of the study is to **explore the mental health effect after attending a fitness group in a Specialized SCI Rehabilitation Hospital**. The study involves face-to-face interview by using structured questionnaire that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. Related information will be collected from the patients medical record if necessary. Data collectors will receive informed consent from all participants and the collected data will be kept confidential.

Therefore, I look forward to having your kind approval for the dissertation proposal and to start data collection. I can also assure you that I will maintain all the requirements for study.

Sincerely,
Tanjila Islam Shuchi

Tanjila Islam Shuchi
4th Year B.Sc. in Physiotherapy
Session: 2017-2018 Student ID: 112170404
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the dissertation supervisor

Shofiq
Md. Shofiqul Islam,
Head, Department of Physiotherapy, BHPI.

Dissertation presentation date: 9th January 2023

Shofiq 18.02.2023
Head, Department of Physiotherapy, BHPI
Md. Shofiqul Islam
Associate Professor & Head
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapaini Savar, Dhaka-1343

Allow for data collection
from SCI unit.
23/02/23
MUZAFFAR HOSSAIN
Jewell Consultant Physiotherapy & Incharge
Sondoro nury (SCI) Unit, Physiotherapy Department
CRP Chapaini Savar, Dhaka-1343

IRB Permission Letter



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) Bangladesh Health Professions Institute (BHPI)

(The Academic Institute of CRP)

Ref:

CRP/BHPI/IRB/03/2023/695

Date:

13/03/2023

To
Tanjila Islam Shuchi
B.Sc. in Physiotherapy
Session: 2017-2018, DU Reg. No: 8634
BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the dissertation proposal “**Mental Health Effect of People with Spinal Cord Injury after the Completion of Fitness Session**” by the ethics committee.

Congratulations

Dear Tanjila Islam Shuchi

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with you, as the Principal Investigator Md. Shofiqul Islam, Head of the department, Department of Physiotherapy (BHPI) as dissertation supervisor. The following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (English and Bengali versions)
3	Information sheet & consent form

The purpose of the study is to explore the mental health effect after attending a fitness group in a Specialized SCI Rehabilitation Hospital. Should there be any interpretation, type, spelling, or grammatical mistakes in the title, it is the responsibility of the investigator. Since the study involves a questionnaire that takes a maximum of 30- 40 minutes and has no likelihood of any harm to the participants, the members of the Ethics committee approved the study to be conducted in the presented form at the meeting held at 09:00 AM on January 9, 2023, at BHPI, 34th IRB Meeting.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol, and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working under the Nuremberg Code 1947, the World Medical Association Declaration of Helsinki, 1964 - 2013, and other applicable regulations.

Best regards,

Muhammad Millat Hossain
Associate Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB), BHPI
CRP, Savar, Dhaka-1343, Bangladesh

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